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1 Present NIPA Saving Measures: Their Characteristics and Limitations

Thomas M. Holloway

In public policy debates, it has often been suggested that saving and saving rates in the United States are too low to permit adequate capital formation. The saving measures being considered in these policy debates frequently are those from the national income and product accounts (NIPAs) produced by the Bureau of Economic Analysis (BEA).¹ Because of the policy relevance of NIPA saving measures, it is important that the concepts and measurement procedures be clearly understood and that the limitations of these measures be recognized.

The purpose of this paper is to provide an overview of present NIPA saving measures and to discuss their limitations and possible alternative measures. The paper has four sections. The first section provides an introduction to the NIPA measures considered in the paper and comments on some widely known trends reflected by these measures. The second section discusses NIPA concepts and conventions that are particularly relevant to the measurement of saving, focusing on the production boundary, sectoring, classifications, attributions, and imputations. The third section provides a brief summary of measurement procedures and then reviews the scope and importance of revisions to NIPA saving measures, emphasizing the results from the comprehensive revision of the NIPAs that became available in December 1985

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(hereafter referred to as the 1985 comprehensive revision). The fourth section discusses limitations and criticisms of present NIPA saving measures and describes some alternative measures.

1.1 Introduction and Trends

1.1.1 Introduction to NIPA Saving Measures

In the NIPAs, saving reflects resources freed for investment, where investment is defined as the sum of purchases of fixed capital goods (structures and equipment) by private business and nonprofit institutions, the value of the change in the physical volume of inventories held by private business, and the changes in net claims of U.S. residents on foreigners.

NIPA saving measures appear in NIPA table 5.1, which is published regularly in the *Survey of Current Business* (1985 estimates are reproduced here in table 1.1). Gross saving is gross private saving plus the government surplus or deficit (measured on a NIPA basis) plus capital grants received by the United States (net). In turn, gross private saving is the sum of personal saving, undistributed corporate profits with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), corporate and noncorporate capital consumption

Table 1.1 NIPA Gross Saving and Investment, 1985 (billions of dollars)

| Measure | Amount |
|--|--------|
| Gross saving | 551.5 |
| Gross private saving | 687.8 |
| Personal saving | 143.3 |
| Undistributed corporate profits with inventory valuation and capital consumption adjustments | 107.3 |
| Undistributed profits | 49.8 |
| Inventory valuation adjustments | -.6 |
| Capital consumption adjustments | 58.1 |
| Corporate capital consumption allowances with capital consumption adjustment | 268.2 |
| Noncorporate capital consumption allowances with capital consumption adjustment | 169.0 |
| Wage accruals less disbursements | 0 |
| Government surplus or deficit (-), NIPAs | -136.3 |
| Federal | -198.0 |
| State and local | 61.7 |
| Capital grants received by the United States (net) | 0 |
| Gross investment | 545.9 |
| Gross private domestic investment | 661.1 |
| Net foreign investment | -115.2 |
| Statistical discrepancy | -5.5 |

allowances (CCA) with CCAdj (hereafter referred to as capital consumption), and wage accruals less disbursements. The government surplus or deficit is the measure of government saving and is the sum of the surplus or deficit of the federal government and of state and local governments.

Gross investment consists of gross private domestic investment and net foreign investment. To complete the saving picture, net foreign investment must be discussed. In the NIPAs, foreign-sector transactions underlying net foreign investment are treated not as additions to or deductions from gross saving but as uses of gross saving. Alternatively, these transactions could be listed under saving by simply reversing the sign of net foreign investment, calling it net foreign saving, and making the appropriate adjustments to gross saving and investment. Regardless of whether these transactions are treated as saving or investment, net foreign investment less capital grants received by the United States (net) is a measure of whether the United States receives net saving from abroad (if the difference is negative) or is a net lender (if the difference is positive). Because capital grants are very small in most years, net foreign investment alone with the sign reversed reflects most foreign-sector saving. Definitions of many of these saving and investment measures are reported in BEA publications.²

Some NIPA saving measures are estimated directly (e.g., capital consumption). However, other NIPA saving measures are defined as differences between large aggregates (e.g., personal saving is the difference between disposable personal income and personal outlays). Consequently, the NIPA concepts, conventions, and methods underlying these aggregates contribute to the determination of saving measures. Some of the more important concepts, conventions, and methods are discussed later in the paper.

1.1.2 Trends in Major NIPA Saving Measures

Table 1.2 shows annual estimates of NIPA saving measures for 1950–85. The lower part of the table shows averages for 5- and 10-year subperiods. Most of the measures are shown as percentages of gross national product (GNP); net private saving is also shown as a percentage of net national product, and personal saving is also shown as a percentage of disposable personal income.³ Personal saving as a percentage of disposable personal income—the personal saving rate—is the only saving ratio regularly published by BEA. Net private saving is not shown in table 1.1. It is gross private saving less CCA with CCAdj and is a measure of private saving after allowances for capital consumption. No depreciation is calculated for the government sector in the NIPAs; consequently, net and gross government saving are the same.

Table 1.2 **NIPA Saving Measures**

| Year | Percentage of GNP | | | | | | | | | | | |
|------|-------------------|----------------------|---------------------------------|-----------------|--|---|-----------|--------------|-----------------------------------|---------|-----------------|--------------------|
| | Gross Saving | Gross Private Saving | Net Private Saving ^a | Personal Saving | Undistributed Corporate Profits ^b | Capital Consumption Allowances ^c | | | Government Surplus or Deficit (–) | | | |
| | | | | | | Total | Corporate | Noncorporate | Total | Federal | State and Local | Other ^d |
| 1950 | 18.2 | 15.4 | 7.2 | 4.4 | 2.8 | 8.2 | 4.3 | 3.9 | 2.8 | 3.2 | –.4 | 0 |
| 1951 | 17.6 | 15.8 | 7.6 | 5.0 | 2.6 | 8.2 | 4.3 | 3.9 | 1.8 | 1.9 | –.1 | 0 |
| 1952 | 14.9 | 16.0 | 7.7 | 4.9 | 2.7 | 8.3 | 4.4 | 4.0 | –1.1 | –1.1 | 0 | 0 |
| 1953 | 13.7 | 15.6 | 7.3 | 5.0 | 2.3 | 8.3 | 4.4 | 3.9 | –1.9 | –1.9 | 0 | 0 |
| 1954 | 13.9 | 15.8 | 7.1 | 4.4 | 2.6 | 8.7 | 4.6 | 4.1 | –1.9 | –1.6 | –.3 | 0 |
| 1955 | 16.9 | 16.1 | 7.6 | 3.9 | 3.6 | 8.5 | 4.5 | 4.0 | .8 | 1.1 | –.3 | 0 |
| 1956 | 18.1 | 16.8 | 7.9 | 5.0 | 3.0 | 8.9 | 4.8 | 4.1 | 1.2 | 1.4 | –.2 | 0 |
| 1957 | 17.1 | 16.9 | 7.8 | 5.0 | 2.7 | 9.1 | 5.0 | 4.1 | .2 | .5 | –.3 | 0 |
| 1958 | 14.1 | 16.9 | 7.5 | 5.3 | 2.2 | 9.4 | 5.2 | 4.2 | –2.8 | –2.3 | –.5 | 0 |
| 1959 | 16.2 | 16.6 | 7.5 | 4.4 | 3.1 | 9.0 | 5.0 | 4.0 | –.3 | –.2 | –.1 | 0 |
| 1960 | 16.3 | 15.7 | 6.7 | 4.0 | 2.7 | 9.0 | 5.0 | 4.0 | .6 | .6 | 0 | 0 |
| 1961 | 15.5 | 16.3 | 7.3 | 4.7 | 2.7 | 9.0 | 5.0 | 4.0 | –.8 | –.7 | –.1 | 0 |
| 1962 | 15.9 | 16.6 | 8.0 | 4.5 | 3.5 | 8.6 | 4.8 | 3.8 | –.7 | –.7 | .1 | 0 |
| 1963 | 16.3 | 16.1 | 7.7 | 4.1 | 3.6 | 8.5 | 4.8 | 3.7 | .1 | 0 | .1 | 0 |
| 1964 | 16.7 | 17.1 | 8.8 | 4.8 | 3.9 | 8.3 | 4.7 | 3.6 | –.4 | –.5 | .2 | 0 |
| 1965 | 17.5 | 17.4 | 9.3 | 4.9 | 4.4 | 8.1 | 4.6 | 3.5 | .1 | .1 | 0 | 0 |
| 1966 | 16.9 | 17.0 | 9.0 | 4.7 | 4.3 | 8.0 | 4.6 | 3.4 | –.2 | –.2 | .1 | 0 |
| 1967 | 15.9 | 17.6 | 9.4 | 5.5 | 3.8 | 8.3 | 4.8 | 3.5 | –1.7 | –1.6 | –.1 | 0 |
| 1968 | 15.6 | 16.3 | 8.0 | 4.8 | 3.3 | 8.3 | 4.8 | 3.4 | –.7 | –.7 | 0 | 0 |
| 1969 | 16.5 | 15.4 | 7.0 | 4.4 | 2.6 | 8.4 | 4.9 | 3.5 | 1.0 | .9 | .2 | 0 |
| 1970 | 15.2 | 16.2 | 7.4 | 5.7 | 1.8 | 8.7 | 5.1 | 3.6 | –1.0 | –1.2 | .2 | .1 |
| 1971 | 15.6 | 17.3 | 8.4 | 6.0 | 2.4 | 8.8 | 5.2 | 3.7 | –1.8 | –2.0 | .2 | .1 |
| 1972 | 16.5 | 16.8 | 7.9 | 5.1 | 2.8 | 8.9 | 5.2 | 3.7 | –.3 | –1.4 | 1.1 | 0 |
| 1973 | 18.5 | 18.0 | 9.3 | 6.5 | 2.7 | 8.7 | 5.0 | 3.7 | .6 | –.4 | 1.0 | 0 |
| 1974 | 16.8 | 17.3 | 7.9 | 6.6 | 1.4 | 9.3 | 5.4 | 3.9 | –.3 | –.8 | .5 | –.1 |

| Addenda: | | | | | | |
|----------|---|--|--|------------------|---|---|
| | Net Private Saving as a Percentage of Net National Product | Personal Saving as a Percentage of Disposable Personal Income | Net Foreign Investment as a Percentage of GNP | GNP ^e | Net National Product ^e | Disposable Personal Income ^e |
| 1950 | 7.9 | 6.1 | — .6 | 288.3 | 264.6 | 207.5 |
| 1951 | 8.3 | 7.3 | .3 | 333.4 | 306.2 | 227.6 |
| 1952 | 8.4 | 7.3 | .2 | 351.6 | 322.5 | 239.8 |
| 1953 | 8.0 | 7.2 | — .3 | 371.6 | 340.7 | 255.1 |
| 1954 | 7.7 | 6.3 | .1 | 372.5 | 340.0 | 260.5 |
| 1955 | 8.3 | 5.8 | .1 | 405.9 | 371.5 | 278.8 |
| 1956 | 8.7 | 7.2 | .7 | 428.2 | 390.1 | 297.5 |
| 1957 | 8.5 | 7.2 | 1.1 | 451.0 | 409.9 | 313.9 |
| 1958 | 8.3 | 7.5 | .2 | 456.8 | 414.0 | 324.9 |
| 1959 | 8.3 | 6.3 | — .2 | 495.8 | 451.2 | 344.6 |
| 1960 | 7.4 | 5.8 | .6 | 515.3 | 468.9 | 358.9 |
| 1961 | 8.0 | 6.6 | .8 | 533.8 | 486.1 | 373.8 |
| 1962 | 8.7 | 6.5 | .7 | 574.6 | 525.2 | 396.2 |
| 1963 | 8.4 | 5.9 | .8 | 606.9 | 555.5 | 415.8 |
| 1964 | 9.5 | 7.0 | 1.2 | 649.8 | 595.9 | 451.4 |
| 1965 | 10.1 | 7.0 | .9 | 705.1 | 647.7 | 486.8 |
| 1966 | 9.8 | 6.8 | .5 | 772.0 | 709.9 | 525.9 |
| 1967 | 10.2 | 8.0 | .4 | 816.4 | 749.0 | 562.1 |
| 1968 | 8.8 | 7.0 | .2 | 892.7 | 818.7 | 609.6 |
| 1969 | 7.6 | 6.4 | .2 | 963.9 | 882.5 | 656.7 |
| 1970 | 8.2 | 8.1 | .5 | 1,015.5 | 926.6 | 715.6 |
| 1971 | 9.3 | 8.5 | .1 | 1,102.7 | 1,005.1 | 776.8 |
| 1972 | 8.6 | 7.3 | — .2 | 1,212.8 | 1,104.8 | 839.6 |
| 1973 | 10.1 | 9.4 | .6 | 1,359.3 | 1,241.2 | 949.8 |
| 1974 | 8.7 | 9.3 | .4 | 1,472.8 | 1,335.4 | 1,038.4 |

(continued)

Table 1.2 (continued)

| | Percentage of GNP | | | | | | | | | | | |
|------------------|-------------------|----------------------------|---------------------------------------|--------------------|---|--|-----------|-------------------|--------------------------------------|---------|-----------------------|--------------------|
| | Gross Saving | Gross Private Saving | Net Private Saving ^a | Personal Saving | Undistri- buted Corporate Profits ^b | Capital Consumption Allowances ^c | | | Government Surplus or Deficit (–) | | | |
| | | | | | | Total | Corporate | Noncor- porate | Total | Federal | State and Local | Other ^d |
| | | | | | | | | | | | | |
| 1975 | 14.9 | 19.0 | 8.9 | 6.5 | 2.3 | 10.1 | 6.0 | 4.1 | –4.1 | –4.3 | .3 | 0 |
| 1976 | 15.9 | 18.0 | 8.0 | 5.4 | 2.6 | 10.1 | 6.0 | 4.0 | –2.2 | –3.0 | .9 | 0 |
| 1977 | 16.9 | 17.8 | 7.7 | 4.6 | 3.1 | 10.1 | 6.1 | 4.1 | –1.0 | –2.3 | 1.4 | 0 |
| 1978 | 18.2 | 18.2 | 8.0 | 4.9 | 3.1 | 10.2 | 6.1 | 4.1 | 0 | –1.3 | 1.3 | 0 |
| 1979 | 18.3 | 17.8 | 7.2 | 4.7 | 2.5 | 10.6 | 6.3 | 4.3 | .5 | –.6 | 1.1 | 0 |
| 1980 | 16.3 | 17.5 | 6.4 | 5.0 | 1.4 | 11.1 | 6.6 | 4.5 | –1.3 | –2.2 | 1.0 | 0 |
| 1981 | 17.1 | 18.0 | 6.6 | 5.2 | 1.4 | 11.4 | 6.9 | 4.5 | –1.0 | –2.1 | 1.1 | 0 |
| 1982 | 14.1 | 17.6 | 5.5 | 4.9 | .6 | 12.1 | 7.4 | 4.7 | –3.5 | –4.6 | 1.1 | 0 |
| 1983 | 13.6 | 17.4 | 5.7 | 3.8 | 1.9 | 11.6 | 7.1 | 4.5 | –3.8 | –5.2 | 1.4 | 0 |
| 1984 | 15.2 | 17.9 | 6.9 | 4.5 | 2.4 | 11.0 | 6.7 | 4.3 | –2.7 | –4.5 | 1.8 | 0 |
| 1985 | 13.8 | 17.2 | 6.3 | 3.6 | 2.7 | 10.9 | 6.7 | 4.2 | –3.4 | –5.0 | 1.5 | 0 |
| Period averages: | | | | | | | | | | | | |
| 1950–59 | 16.0 | 16.2 | 7.5 | 4.7 | 2.8 | 8.7 | 4.7 | 4.0 | –.2 | 0 | –.2 | 0 |
| 1950–54 | 15.5 | 15.7 | 7.4 | 4.7 | 2.6 | 8.3 | 4.4 | 4.0 | –.2 | –.1 | –.2 | 0 |
| 1955–59 | 16.4 | 16.7 | 7.7 | 4.7 | 2.9 | 9.0 | 4.9 | 4.1 | –.2 | .1 | –.3 | 0 |
| 1960–69 | 16.3 | 16.6 | 8.2 | 4.7 | 3.5 | 8.4 | 4.8 | 3.6 | –.3 | –.3 | 0 | 0 |
| 1960–64 | 16.2 | 16.4 | 7.7 | 4.4 | 3.3 | 8.6 | 4.9 | 3.8 | –.2 | –.3 | .1 | 0 |
| 1965–69 | 16.4 | 16.7 | 8.5 | 4.8 | 3.6 | 8.2 | 4.8 | 3.5 | –.3 | –.3 | 0 | 0 |
| 1970–79 | 16.9 | 17.7 | 8.0 | 5.5 | 2.5 | 9.7 | 5.8 | 4.0 | –.9 | –1.7 | .9 | 0 |
| 1970–74 | 16.7 | 17.1 | 8.2 | 6.0 | 2.2 | 8.9 | 5.2 | 3.7 | –.5 | –1.1 | .6 | 0 |
| 1975–79 | 17.0 | 18.1 | 7.9 | 5.1 | 2.7 | 10.2 | 6.1 | 4.1 | –1.1 | –2.1 | 1.0 | 0 |
| 1980–85 | 14.9 | 17.6 | 6.2 | 4.4 | 1.8 | 11.4 | 6.9 | 4.4 | –2.7 | –4.1 | 1.4 | 0 |

| | Net Private Saving as a Percentage of Net National Product | Personal Saving as a Percentage of Disposable Personal Income | Addenda: | | | |
|------|---|--|--|---------|----------------------------|---|
| | | | Net Foreign Investment as a Percentage of GNP | GNP | Net National Product | Disposable Personal Income ^c |
| 1975 | 9.9 | 9.2 | 1.4 | 1,598.4 | 1,436.6 | 1,142.8 |
| 1976 | 8.9 | 7.6 | .5 | 1,782.8 | 1,603.6 | 1,252.6 |
| 1977 | 8.6 | 6.6 | — .4 | 1,990.5 | 1,789.0 | 1,379.3 |
| 1978 | 8.9 | 7.1 | — .4 | 2,249.7 | 2,019.8 | 1,551.2 |
| 1979 | 8.0 | 6.8 | .1 | 2,508.2 | 2,242.4 | 1,729.3 |
| 1980 | 7.2 | 7.1 | .5 | 2,732.0 | 2,428.1 | 1,918.0 |
| 1981 | 7.5 | 7.5 | .3 | 3,052.6 | 2,704.8 | 2,127.6 |
| 1982 | 6.3 | 6.8 | 0 | 3,166.0 | 2,782.8 | 2,261.4 |
| 1983 | 6.5 | 5.4 | — 1.0 | 3,405.7 | 3,009.1 | 2,428.1 |
| 1984 | 7.8 | 6.3 | — 2.4 | 3,765.0 | 3,349.9 | 2,670.6 |
| 1985 | 7.0 | 5.1 | — 2.9 | 3,998.1 | 3,560.9 | 2,828.0 |

(continued)

Table 1.2 (continued)

| | Net Private Saving as a Percentage of Net National Product | Personal Saving as a Percentage of Disposable Personal Income | Addenda: | | | |
|------------------|---|--|--|---------|----------------------------|---|
| | | | Net Foreign Investment as a Percentage of GNP | GNP | Net National Product | Disposable Personal Income ^e |
| Period averages: | | | | | | |
| 1950–59 | 8.3 | 6.8 | .2 | 395.5 | 361.1 | 275.0 |
| 1950–54 | 8.0 | 6.8 | – .1 | 343.5 | 314.8 | 238.1 |
| 1955–59 | 8.4 | 6.8 | .3 | 447.5 | 407.3 | 311.9 |
| 1960–69 | 8.9 | 6.8 | .6 | 703.1 | 643.9 | 483.7 |
| 1960–64 | 8.5 | 6.4 | .8 | 576.1 | 526.3 | 399.2 |
| 1965–69 | 9.2 | 7.0 | .4 | 830.0 | 761.6 | 568.2 |
| 1970–79 | 8.9 | 7.8 | .2 | 1,629.3 | 1,470.5 | 1,137.5 |
| 1970–74 | 9.0 | 8.6 | .3 | 1,232.6 | 1,122.6 | 864.0 |
| 1975–79 | 8.8 | 7.4 | .1 | 2,025.9 | 1,818.3 | 1,411.0 |
| 1980–85 | 7.0 | 6.3 | – 1.1 | 3,353.2 | 2,972.6 | 2,372.3 |

^aNet private saving is gross private saving less capital consumption allowances with capital consumption adjustment.

^bWith inventory valuation and capital consumption adjustments.

^cWith capital consumption adjustment.

^dConsists of wage accruals less disbursements and capital grants received by the United States (net). The values for 1948–51 and 1973 round to zero.

^eBillions of dollars.

Figure 1.1 shows ratios to GNP of gross saving, gross private saving, net private saving, and government saving. Considering the entire 1950–85 period, the gross saving ratio had considerable amplitude but no trend.⁴ The gross private saving ratio had less amplitude and a slightly positive trend; the government saving ratio had about the same amplitude as the gross saving ratio and a negative trend. The relative stability in the NIPA gross private saving ratio has long been noted and is often referred to as “Denison’s law” (Denison 1958).⁵ The net private saving ratio had a slightly negative trend with greater amplitude than the gross private saving ratio but less than the government saving ratio.

Recent developments diverge in important ways from these trends. The mean of the gross saving ratio for the 1980–85 period was considerably less than the means for any of the earlier periods shown in the lower part of table 1.2. Although the gross private saving ratio had been relatively stable since the mid-1970s and the mean for the 1980–85 period was relatively high by historical standards, the negative government saving ratio was large enough to lead to declines in the gross saving ratio. Like the gross saving ratio, the mean of the net private saving ratio was lower in the 1980–85 period than in any of the earlier periods. The reasons are discussed in connection with figure 1.2.

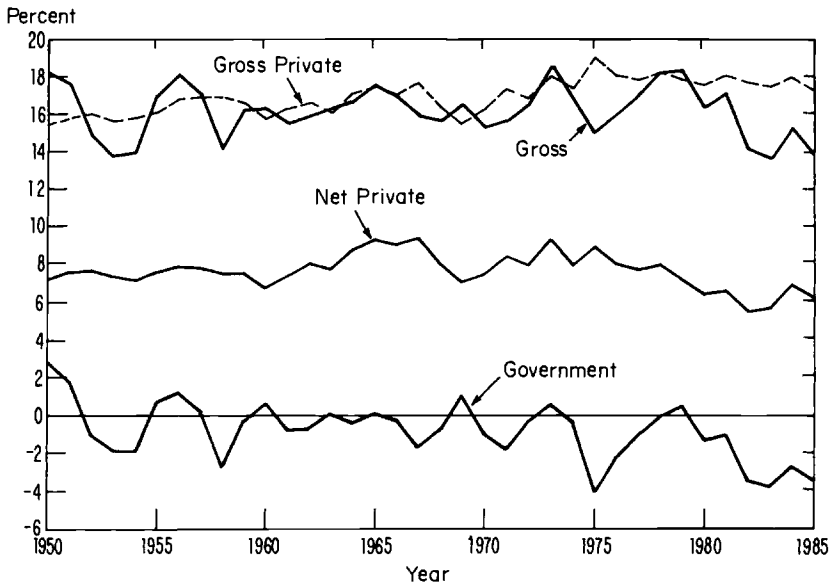
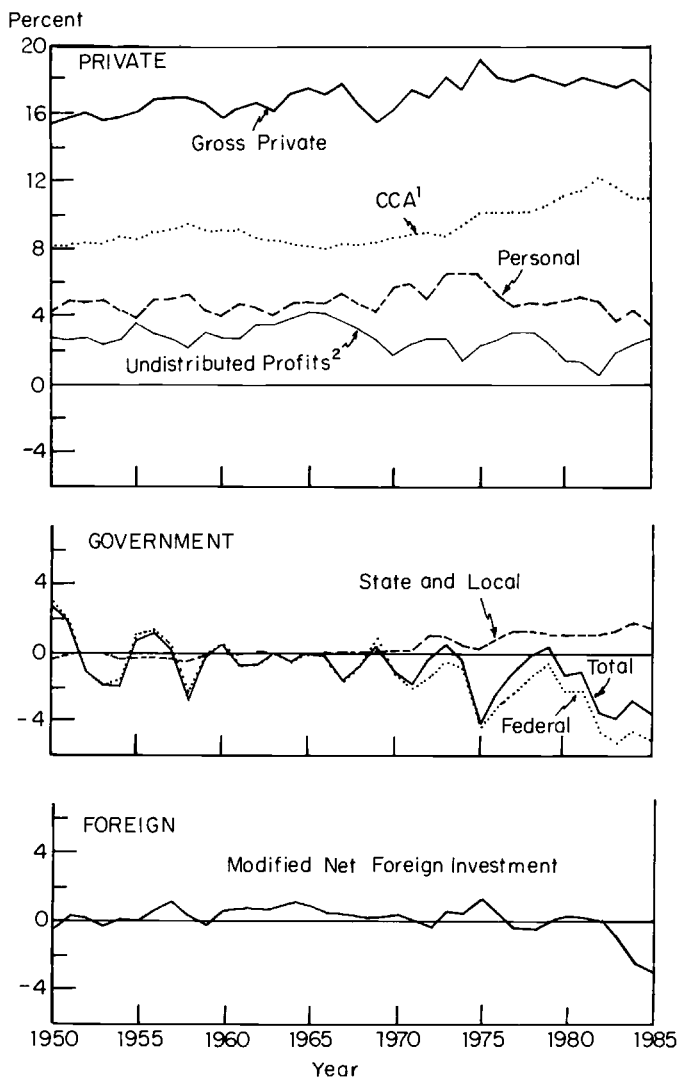


Fig. 1.1

NIPA gross, gross private, net private, and government saving as a percentage of GNP

**Fig. 1.2**

Selected NIPA saving and investment measures, as a percentage of GNP. ¹With capital consumption adjustment. ²With inventory valuation and capital consumption adjustments.

Figure 1.2 shows components of the measures in figure 1.1 and a related measure for the foreign sector. The top panel reproduces the gross private saving ratio and shows its major components: capital consumption, personal saving, and undistributed corporate profits with IVA and CCA_{adj}. The middle panel reproduces the government surplus

or deficit ratio and shows its components: the federal surplus or deficit and the state and local government surplus or deficit. The bottom panel shows the foreign-sector measure discussed earlier: net foreign investment less capital grants received by the United States (net), hereafter referred to as modified net foreign investment.

The additional measures shown in figure 1.2 provide interesting insights into patterns of saving in the United States. Starting with the top panel, the relative stability in the gross private saving ratio did not occur as a result of stability in its components; rather, two of the components—personal saving and undistributed corporate profits—showed significant fluctuations that were often in opposite directions by similar magnitudes. However, the widely publicized declines in the personal saving ratio during many of the years since the mid-1970s were not entirely offset by movements in the undistributed corporate profits ratio. Consequently, the net private saving ratio, which is approximately the sum of these two ratios, had a downward trend since the mid-1970s.⁶ The gross private saving ratio remained relatively stable because the capital consumption ratio had an upward trend.⁷

The second panel of figure 1.2 shows the sharp contrast between federal and state-local government budget measures. The cyclical pattern of the federal surplus or deficit ratio was unmistakable and accounted for most of the fluctuations of the government surplus or deficit ratio.⁸

The bottom panel of figure 1.2 shows the significant change in recent years in the modified net foreign investment ratio. Starting in 1983, the ratio was relatively large and negative and reflected the growing part of gross investment financed by foreign saving.⁹

To summarize, these trends convey several messages.¹⁰ First, the gross saving ratio declined to uncharacteristically low levels toward the end of the period. Second, federal dissaving offset an increased percentage of gross private saving. Third, the personal saving ratio peaked in the mid-1970s, then declined to levels similar to those in the early part of the period. Fourth, capital consumption accounted for an increased percentage of gross saving toward the end of the period relative to the early part of the period. Fifth, reliance on foreign saving to finance investment grew toward the end of the period.

These messages, of course, depend on the nature and validity of the underlying saving measures. In turn, the saving measures are determined by numerous concepts and conventions underlying the NIPAs.

1.2 Concepts and Conventions

NIPA saving measures are part of a broader NIPA framework and, as such, reflect the purposes, concepts, conventions, and methods

associated with that framework. In this section, some of the concepts and conventions that are especially relevant to NIPA saving measures are discussed. First, the general purposes, scope, and accounting framework of the NIPAs are summarized. Second, some of the sectoring conventions in the NIPAs are discussed. Third, classifications, attributions, and imputations that have important implications for saving measures are discussed.

1.2.1 Purposes, Scope, and Accounting Framework of the NIPAs

Two fundamental purposes of the NIPAs can be identified (Young and Tice 1985; Bureau of Economic Analysis 1985b).¹¹ The first is to measure current production, its composition, and its distribution.¹² The second is to provide an overview of the processes involved in the production, distribution, and use of the nation's output. Clearly, the NIPAs are built around the concept of current production. Among other things, this focus has important implications for the accounts with respect to what types of activities should be included and what types excluded. Capital gains (and losses) are an important case in point.¹³

Both realized and unrealized capital gains are excluded from the NIPAs on the ground that these gains do not reflect current production. Because there is widespread agreement that capital gains have important effects on economic behavior in general and consumption/saving decisions in particular, the NIPA exclusion is noteworthy. Some alternative measures of saving discussed later go beyond the NIPA framework and include capital gains.

The exclusion of capital gains from the NIPAs follows from the focus on current production. However, the boundary of what exactly constitutes production—the scope of the NIPAs—requires the adoption of conventions. These conventions reflect both conceptual concerns and considerations related to the feasibility and practicality of measurement. For the most part, NIPA production is limited to market transactions. Valuation is at market prices.¹⁴ There are also a few imputations for nonmarket activities that are closely related to market counterparts. Some of the most important imputations are for wages and salaries in kind, the value of services from owner-occupied dwellings, food and fuel produced and consumed on farms, and the value of services provided without charge by financial intermediaries (excluding life insurance carriers). Most other nonmarket activities are excluded from NIPA production.¹⁵

Another important convention determining the production boundary is the exclusion of illegal activity. The NIPAs exclude activities that are prohibited by federal, state, or local laws. Two of the reasons often given for excluding illegal activities are that they do not contribute to economic welfare and/or that they are difficult to measure (Easterlin 1958; Carson 1984b).¹⁶ Consequently, some activities that by all other

relevant criteria would be included in the NIPAs are excluded because of legal prohibition. A classic case was the purchase of alcoholic beverages during Prohibition: personal consumption expenditures for alcoholic beverages was set equal to zero during those years. Exploratory work is underway at BEA to measure illegal activities within the NIPA framework.¹⁷

The determination of what constitutes production provides guides to establishing an accounting framework for measurement.¹⁸ The skeleton of that framework is provided by the familiar NIPA five-account summary with GNP—a production measure—as the central focus.¹⁹ Appendix A shows the five-account summary. Conceptually, the summary accounts are based on production, appropriation, and saving-investment accounts of four NIPA sectors: business, households and related institutions, government, and foreign.²⁰ The first of the five summary accounts reports GNP and is a consolidation of the business, household, government, and foreign production accounts and the business appropriation account. The second summary account shows personal income, outlays, and saving and represents the household appropriation account. The third account shows receipts, expenditures, and the surplus or deficit of government and represents the government appropriation account. The fourth account shows foreign transactions and is a consolidation of the foreign appropriation and foreign saving-investment accounts. The fifth summary account shows gross saving and investment and is a consolidation of the business, household, and government saving-investment accounts (NIPA table 5.1, reproduced earlier as table 1.1, is a slightly more detailed representation of the fifth account).

Within this accounting framework, NIPA gross saving is the source of resources for gross private domestic investment (GPDI) and net foreign investment.²¹ GPDI represents purchases of private fixed capital goods and the change in business inventories. As alluded to earlier, capital goods include structures and equipment purchased by private business and nonprofit institutions. These purchases include private purchases of new residential structures for either tenant or owner occupancy and net purchases of used capital goods. The detailed components of NIPA saving show the sources of gross saving for this investment.

To make the accounting framework operational, many additional concepts and conventions must be adopted, some of which concern who or what is included in each sector, how transactions are classified within the sectors, and how transactions are attributed to the sectors.

1.2.2 Sectoring

Four sectors were noted above in connection with the NIPA accounting framework: business, households and institutions, government,

and foreign. From the standpoint of measuring production, the business sector includes all organizations that produce goods and services for sale at a price intended to cover the costs of production. In addition to corporate and noncorporate entities organized for profit, other entities, such as Federal Reserve banks and government enterprises, are included.²² Homeowners, in their role as owner occupants, are also included.

The determination of what constitutes the business sector helps define what entities and activities constitute the remaining sectors. The household and institutions sector includes households, which consist of families and unrelated individuals, and nonprofit institutions serving individuals. The only activities of the household and institutions sector that constitute production are the services rendered by nonprofit institutions and by domestic workers employed by households. All the other activities of households, such as purchases of new owner-occupied dwellings, are excluded from the sector because they are classified elsewhere. The government sector includes all federal, state, and local government agencies except government enterprises. Finally, foreign transactions related to production define the rest-of-the-world sector. The rest-of-the-world sector is the difference between production abroad attributed to U.S. factors of production and production in the United States attributed to foreign factors of production.

These few remarks about sectoring with respect to measuring production are suggestive of the complexities involved in classifying entities and activities into sectors. Further complexities emerge with respect to saving measures. The categories of NIPA saving that constitute gross saving do not conform to the sectors noted above with respect to measuring production; rather, the saving measures are defined in appropriation accounts. Consequently, there are many instances of entities classified in one production sector having their saving attributed to another sector.²³ The sum of undistributed corporate profits and corporate CCAs reflects business-sector saving; personal saving reflects household-sector saving; the government surplus or deficit reflects government-sector saving; and net foreign investment with the sign reversed reflects foreign-sector saving. However, there are numerous qualifications. For example, unincorporated business saving from proprietors' income is classified as personal saving, although unincorporated businesses are in the business sector. The saving (surplus or deficit) of government enterprises is classified as government saving, although government enterprises are in the business sector. The reinvested earnings of incorporated foreign affiliates of U.S. corporations included in factor income is in undistributed corporate profits, although these transactions are part of the rest-of-the-world sector. There are many other examples. A brief discussion of NIPA personal saving il-

illustrates some of these sectoring issues and serves as an introduction to a more detailed discussion of classifications, attributions, and imputations.

Personal saving includes the saving of households, nonprofit institutions serving individuals, proprietors, private noninsured pension funds, pension funds operated by life insurance carriers, and private trust funds. Several conventions related to sectoring merit comment.

Nonprofit institutions serving individuals are grouped with households in the NIPAs because they are viewed as associations of individuals and because some of their activities are considered to resemble the activities of households more closely than the activities of other sectors (Denison 1982b).²⁴ The inclusion of proprietors' income and saving arises primarily because many proprietors do not distinguish between their income and saving in a personal versus business capacity (Denison 1955; Jaszi 1958). Consequently, all their income and saving is attributed to households.

The attribution of the saving of private noninsured pension funds, life insurance carriers, and private trust funds to personal saving (even though all but the last of these entities are in the business sector) also partially reflects the notion that these entities are associations of individuals. Consequently, their saving is viewed to be on behalf of households.

1.2.3 Classifications, Attributions, and Imputations

The discussion of sectoring and remarks about personal saving illustrate the fact that many decisions affect NIPA saving measures. Additional details about classifications, attributions, and imputations highlight some of these decisions and help clarify the nature of the saving measures.

Perhaps the most fundamental classification decision affecting NIPA saving measures concerns what BEA defines as investment.²⁵ Because investment expenditures are matched by equal changes in saving, the classification of an expenditure as investment has a direct effect on saving.²⁶ In the NIPAs, investment, or capital formation, is mainly restricted to the business sector, where the operational guideline used in the NIPAs is to measure investment as business expenditures not charged to current expenses (Jaszi 1958, 1971). Capital formation by households in the form of housing is treated as business activity. Capital formation by government is not recognized. Further, some expenditures by business (e.g., for research and development) are expensed by business and treated as current purchases in the NIPAs, but in some ways are conceptually similar to investment expenditures (Blades 1983). Finally, some expenditures expensed by business (e.g.,

certain expenditures for mining exploration, shafts, and wells) are treated as investment in the NIPAs.

The present NIPA classifications of owner-occupied housing, consumer durable goods, government structures and durable goods, and research and development expenditures merit additional discussion. The major reasons for the present classifications and the roles of attributions and imputations in the treatment of owner-occupied housing are discussed next; criticisms of some of the present classifications are discussed in the final section.

It was noted earlier that all private purchases of new residential structures, including those for owner occupancy, are classified as investment. Under this treatment, owner occupants are classified as unincorporated entities in the business sector. These entities pay all the expenses associated with owning the residential structure and receive imputed space rental for the housing services provided. Imputed space rental is the largest single imputation in the NIPAs.²⁷ In 1985, it was \$286 billion or about 11 percent of personal consumption expenditures. The difference between imputed space rental and expenses, including capital consumption, is imputed rental income. In the case of nonfarm housing, this income is included in rental income of persons; in the case of farm housing, it is included in farm proprietors' income. In 1985, imputed rental income was about –\$19 billion, and imputed proprietors' income from farm housing was about \$4 billion.

This treatment recognizes that housing provides a long-term flow of services to the owner occupant. If housing were not treated as part of capital formation, only the initial purchase would appear; the subsequent flow of services would be omitted.

In many respects, other consumer durable goods also yield a flow of services over time, but personal consumption expenditures for durable goods are not capitalized. Conceptually, consumer durable goods could be treated exactly the same way as housing. However, major conceptual and statistical difficulties arise in estimating the value of services.²⁸ In the case of housing, the imputed rental value is based on a viable market analogy with rental housing that allows the determination of the value of services. In the case of other consumer durable goods, the market analogy is frequently much weaker.

Although consumer durable goods remain a current purchase in the NIPAs, BEA regularly publishes estimates of gross and net stocks of these goods.²⁹ Estimates of capital consumption are available on request. Work was also done at BEA on estimating the service value of consumer durables, but this work is not regularly updated (Katz and Peskin 1980).

Purchases of government structures and durable goods are also classified as current purchases in the NIPAs. As with consumer durable

goods, government structures and durable goods could be capitalized and a flow of services could be attributed to them. However, the value of services for government capital is even more difficult to determine than that for consumer durable goods.³⁰

To provide information on government capital, BEA regularly publishes estimates of gross and net stocks.³¹ Estimates of capital consumption are available on request. Work was also done at BEA on estimating the value of services provided by the stock of government-owned fixed capital, but this work is not regularly updated (Martin, Landefeld, and Peskin 1982).

Research and development expenditures by both business and government are classified as current purchases. In the case of business, the purchases are intermediate; in the case of government and nonprofit institutions, the purchases are final, but they are not part of investment. Two of the reasons for classifying research and development expenditures as current purchases include difficulty in defining what constitutes research and development subject to classification as investment and difficulties in determining service lives, depreciation, and valuation of intangible investment (Jaszi 1973).³²

These classification conventions have a direct bearing on NIPA saving measures because reclassification of any of these types of expenditures would affect gross saving on a dollar-for-dollar basis. The effects on the components of gross saving would depend on what sector the expenditure was in and the corresponding estimates of capital consumption. The effects of reclassifying some of these purchases are discussed further in the final section.

Classifications, attributions, and imputations related to pensions also play important roles in shaping NIPA saving measures. Because private and public pensions involve significantly different treatments in the NIPAs, it is helpful to discuss them separately.³³

The NIPA treatment of private pension funds—private noninsured pension funds and funds operated by life insurance carriers—is especially significant in the determination of personal saving because most of the investment earnings and operating expenses of these funds are attributed to persons.³⁴ Additional smaller effects arise as a result of the related treatments of contributions and benefits.

The attribution to persons of investment earnings by private pension funds is accomplished through imputations. Pension fund reserves are viewed as though they are owned by individuals. Consequently, the investment earnings on these reserves are shown as imputed interest to persons to recognize that these earnings belong to the ultimate beneficiaries.³⁵ The earnings are attributed in the year they accrue.

To maintain a consistent treatment of private pension funds, an estimate of the operating expenses of these funds is attributed to persons

as part of personal consumption expenditures (PCE). Because operating expenses, which exclude benefit payments, are much less than the income items, and because these income items are not subject to personal taxes, private pension funds account for a significant positive contribution to personal saving.³⁶

Employer contributions to private pension funds are considered current compensation and are classified as other labor income. This classification also means these contributions are part of personal income and disposable personal income. Because income is recorded at the time of the employer contribution, it is necessary to exclude private pension benefits from income at the time they are received to avoid double counting. Consequently, benefits received do not appear in the NIPAs, although estimates are prepared by BEA and published in a supplemental table.³⁷ The convention of treating contributions rather than benefits as part of personal income affects personal saving partly through differences in the amounts of contributions and benefits.

Public pension funds are treated differently. The most important types of public pensions are social security, federal civilian retirement, and state and local government retirement. The NIPA treatment of these funds affects the government surplus or deficit and personal saving. The most important NIPA conventions concern the treatments of contributions, benefits, and earnings of the funds. These treatments arise because the saving of these funds is considered to be part of government saving rather than private saving. Both employer and employee contributions to public pension funds are classified as contributions for social insurance. This classification means that they are excluded from personal income and disposable personal income but included in government receipts. Benefits paid are classified as government transfer payments. This means that they are included in government expenditures and in personal income.³⁸ Thus, public pensions affect the government surplus or deficit through their effects on receipts and expenditures. They affect personal saving through their effects on personal income.

The treatment of the investment earnings by public pension funds is less complicated than the treatment of private funds. In the case of federal pension funds, all funds must be invested in federal government securities until 1988. Therefore, interest on federal pension funds has no effect on federal net interest paid and no effect on the government surplus or deficit.³⁹ This limitation on investment is a major reason for the present treatment of federal pension funds. Starting in 1988, investment options in federal civilian pension funds will be more flexible and more like state and local government pension funds.

State and local government pension funds, unlike federal pension funds, can be invested in a wide variety of securities, including cor-

porate stocks. Earnings from these securities include both interest and dividends and are recorded as offsets to expenditures.⁴⁰ Consequently, the investment earnings of state and local pension funds affect the government surplus or deficit to the extent that these earnings are not from municipal securities.

These treatments of contributions, benefits, and earnings highlight an important distinction between private pension funds and public pension funds. The income to persons from private pension funds is attributed when paid into the funds or when earned in the funds in the case of investment earnings; the income to persons from public pension funds is attributed when transfer payments are received.

Partly because of this difference between income flows, and because of similarities between the objectives of private and public pension funds, it has sometimes been suggested that the treatment of private and public pensions, at least state and local government funds, should be more consistent. This point is explored more later in the paper.

A final point concerning the NIPA treatment of pensions is that there is no attempt to introduce estimates of the discounted present value of unfunded liabilities associated with public pension funds. Estimates of unfunded liabilities are often discussed in connection with social security (Boskin 1986). Such estimates would obviously be extremely sensitive to assumed parameters and could cause very large swings in NIPA gross saving.

1.3 Measurement and Revisions

It was noted earlier that some NIPA saving measures are derived as differences between large aggregates. Where the estimates of the aggregates are derived independently, as in personal saving, revisions in saving measures are more likely to arise. Personal saving is measured as the difference between disposable personal income and personal outlays; government saving (surplus or deficit) is measured as the difference between government receipts and government expenditures; and so forth. As a consequence, relatively small percentage revisions in either of the aggregates can result in very large revisions in saving. For example, at 1985 levels, a 1 percent upward revision in disposable personal income or a 1 percent downward revision in personal outlays would result in a 20 percent upward revision in personal saving and a 0.6 percentage point increase in the personal saving rate, *ceteris paribus*.

Consequently, it is clear that the precision of the measurement of the aggregates has important consequences for NIPA saving measures. In this section, a few comments about the sources and methods underlying the saving measures are provided. With this background, the

discussion turns to revisions in NIPA saving measures. The 1985 comprehensive revision serves as the main example.

1.3.1 Sources and Methods

NIPA estimates rely on a wide variety of source data and methods. Appendix B provides some notes on the sources and methods underlying NIPA saving measures. As the appendix shows, nearly all the NIPA estimates depend on data subject to reporting lags and revisions. Consequently, revisions in the NIPAs must be made periodically to incorporate revisions in the underlying source data.

The appendix indicates that tax return data play a particularly important part in the NIPA estimates of income. Data from the income tax returns of corporations, sole proprietorships, and partnerships are compiled by the Internal Revenue Service (IRS) and reported in the *Statistics of Income* series. Data from payroll tax returns of employers covered under state unemployment insurance programs are compiled by the Bureau of Labor Statistics (BLS) and reported in *Employment and Wages*. Because it is widely recognized that there is misreporting (specifically, underreporting of income and failure to file) in the tax return data, the BEA makes adjustments to correct for it. The revisions in annual estimates discussed next partly resulted from improvements in these adjustments.

1.3.2 Sources of Revisions

The size, frequency, and sources of revisions in economic statistics are obviously very important. If the statistics are subject to large and frequent revisions, their value in economic studies and policy discussions is slight.⁴¹ Revisions can arise for many reasons. First, estimates may be revised to produce series that better reflect current institutions or types of activities. Second, estimates may be revised to incorporate more up-to-date or improved source data. Third, estimates may be revised to incorporate improved statistical methods and estimating procedures.

The size and sources of revisions in annual NIPA saving measures are discussed below. The focus is on the revisions resulting from the 1985 comprehensive revision; however, some revisions from earlier comprehensive revisions will also be discussed briefly.

There are two major types of NIPA revisions: definitional and classificational revisions and statistical revisions. Definitional and classificational revisions are generally changes made to improve the treatment of evolving institutions in the economy and their economic activities. Statistical revisions are generally changes made on the basis of new source data or improved estimating procedures.

For the most part, definitional and classificational revisions are introduced only during comprehensive revisions so that the revisions can be incorporated into historical estimates on a consistent basis. Statistical revisions are made during comprehensive revisions and the regular annual July revisions.

Before turning to the 1985 comprehensive revision, a few examples of definitional and classificational revisions that had important effects on NIPA saving measures from earlier comprehensive revisions serve to illustrate the nature of this type of revision. In the comprehensive revision that became available in January 1976, four definitional and classificational revisions had particularly important effects on NIPA gross saving or its components: the introduction of economic capital consumption, the reclassification of mobile home purchases from PCE to investment, the reclassification of consumer-type durable purchases by landlords from PCE to investment, and the reclassification of outlays for drilling mine shafts from current purchases to investment (Jaszi and Carson 1976).⁴²

The use of economic capital consumption in the NIPAs had been advocated for many years because the tax-return-based depreciation estimates used previously had serious shortcomings for economic analysis.⁴³ Two of the major shortcomings are that tax return depreciation reflects asset lives and depreciation formulas that may not reflect true consumption of fixed capital and that tax return depreciation reflects historical costs and does not reflect replacement costs. The introduction of economic capital consumption, which appeared through the use of an adjustment (CCAdj) to the tax return measures, had important effects on the composition of gross saving but no effect on gross saving itself. In most years covered by the revision, the effects were to increase the estimates of capital consumption, increase undistributed corporate profits, and decrease personal saving.

The reclassification of mobile homes was done because their use as permanent residences had increased significantly from their use for recreational purposes.⁴⁴ The reclassification of consumer-type durable purchases by landlords was done to improve consistency with the investment treatment of housing. The reclassification of outlays for drilling mine shafts was done to improve consistency with the investment treatment of outlays for drilling petroleum and natural gas wells, which had been treated as investment in the NIPAs. These reclassifications necessarily increased capital consumption and gross saving. Because the purchases of these items exceeded their capital consumption, the effect of the reclassifications was also to increase both undistributed corporate profits and personal saving.

The effects of all the definitional and classificational revisions combined were to increase capital consumption in most years, increase

undistributed corporate profits in most years, and decrease personal saving in all years. In some years, the personal saving rate was revised down in level by nearly a full percentage point.

In the comprehensive revision that became available in December 1980, one major definitional and classificational revision had an important effect on NIPA gross saving and its components: the addition of reinvested earnings of incorporated foreign affiliates to receipts and payments of income on direct investment (Denison and Parker 1980).⁴⁵ This definitional revision was made to provide a better treatment of transactions that had become relatively more important and to incorporate improved data that had become available. The main effects were to increase net foreign investment and undistributed corporate profits. These increases, of course, also resulted in increases in gross saving and gross private saving. By the late 1970s, this definitional revision accounted for an upward revision in the ratio of gross saving to GNP of about 0.5 percentage points.

In the 1985 comprehensive revision, three definitional and classificational revisions had effects on NIPA saving measures: the reclassification of replacement railroad track from current purchases to investment, the reclassification of major replacements to residential structures from current purchases to investment, and the reclassification of military shipments financed by "forgiven" loans from government purchases to exports (Bureau of Economic Analysis 1985a; Parker and Fox 1985).

The reclassification of replacement railroad track was done to reflect changes in the accounting treatment adopted by railroads in the early 1980s and to improve consistency within the NIPAs. Outlays intended for replacement of capital in other industries had been treated as NIPA investment. In 1984, the revision increased investment and gross saving by about \$2 billion. The major effects were to increase capital consumption in all years and to decrease undistributed corporate profits in most years. Undistributed corporate profits was revised by the difference between outlays for replacement railroad track and the corresponding depreciation estimates. In most years since 1950, outlays were less than the depreciation estimates, and track mileage declined.

The reclassification of major replacements to residential structures also was done to improve consistency within the NIPAs.⁴⁶ The revision makes the treatment of residential replacements similar to the treatment of nonresidential replacements. In 1984, the revision increased investment and gross saving by about \$14 billion. The major effects were to increase capital consumption and personal saving by substantial amounts in all years and to increase undistributed corporate profits by small amounts in most years. Proprietors' income and rental income of persons, both of which affect personal saving, and undistributed corporate

profits were revised by the differences between outlays for major replacements and the corresponding depreciation estimates.

The reclassification of certain military shipments was done to reflect the nature of these transactions more accurately and to eliminate a difference in treatment between the NIPAs and U.S. international transactions accounts.⁴⁷ The reclassification involved reclassifying shipments from government purchases to exports and reclassifying forgiven loans from military grants to transfer payments to foreigners. The amounts were less than \$1 billion in all years. The main effect was to decrease net foreign investment, the government surplus, and gross saving by equal amounts.

These three definitional and classificational revisions accounted for a significant part of the revisions in NIPA saving measures that occurred during the 1985 comprehensive revision. Statistical revisions accounted for the rest.⁴⁸ As previously noted, statistical revisions result from the introduction of new data and methodological changes. Revisions resulting from new data occur mainly because there are lags and revisions in the source data. Source data that become available less often than annually, such as the economic censuses, were incorporated mainly through the use of BEA's 1977 input-output tables. Other sources included the 1980 Census of Housing, the 1977 Census of Governments, the 1978 Census of Agriculture, and preliminary or summary data from the 1982 economic censuses, the 1982 Census of Agriculture, and the 1982 Census of Governments. Regularly used annual data sources are noted in Appendix B.

Methodological changes, the other major factor underlying statistical revisions, often occur in connection with new source data or new research findings. The most important methodological change in the 1985 comprehensive revision affecting saving concerned improved adjustments for misreporting on tax returns. These adjustments are sometimes referred to as "underground economy" adjustments (Bureau of Economic Analysis 1985a).⁴⁹

It has been noted that tax return data from *Statistics of Income* and *Employment and Wages* are a major source underlying NIPA estimates—including NIPA saving measures. In addition to their direct use in the NIPAs, these data enter the NIPAs indirectly because the Census Bureau uses tax return information in connection with the economic censuses and annual surveys based on these censuses.⁵⁰ In recognition of underreporting on tax returns, the BEA had, for many years, made adjustments for that underreporting. These adjustments were extended by incorporating new information on failure to file income and employment tax returns, by using new estimates of the extent of underreporting, and by introducing adjustments to the census data used in the NIPAs. Methodological, conceptual, and measurement aspects of the

improved adjustments are discussed in Parker (1984a), Bureau of Economic Analysis (1985a), and Parker and Fox (1985).

The most important effects of the improved adjustments were to revise PCE, wages and salaries, and nonfarm proprietors' income up sharply.⁵¹ In 1984, these revisions amounted to about \$44 billion in PCE, about \$24 billion in wages and salaries, and about \$78 billion in nonfarm proprietors' income. Because the revisions in income exceeded those in outlays, the net effect of improved adjustments was to contribute to an upward revision in personal saving. The newly available information did not provide any reason to revise the adjustments to corporate profits or to capital consumption.

Table 1.3 shows total revisions in selected NIPA saving measures and the separate effects of definitional and classificational revisions and of statistical revisions. The estimates primarily reflect revisions from the 1985 comprehensive revision, but the estimates for 1983 and 1984 also reflect the July 1986 revisions.⁵² Total revisions are important. In some respects, the type of revision is irrelevant because the total revision indicates whether the initial estimates provided adequate information for decision makers. In all years, gross saving was revised upward. In most years, these revisions reflected revisions in gross private saving; the noticeable exception was 1984, when most of the revision was the result of an upward revision in state and local government saving. Personal saving was revised upward in most years and typically accounted for about half the revision in gross private saving. Except for 1984, the revisions in government saving were relatively small.

The definitional and classificational revisions increased gross saving in all years shown. The revisions in gross saving and gross private saving were nearly identical. The increases mainly resulted from revisions in capital consumption, but increases in personal saving also contributed. The reasons for these revisions were discussed earlier.

The statistical revisions also increased gross saving in most years shown. As would be expected, the statistical revisions show a great deal of variation. In most years, gross private saving and personal saving were revised upward. The improved adjustments for underreporting made important contributions to the direction of these revisions.

The revisions in level provide a view of relative changes among components of gross saving, but they do not provide a view of how large these revisions are relative to the size of the economy. Figure 1.3 shows a comparison of selected saving ratios based on pre-comprehensive revision data (referred to in the chart as unrevised) and on current data (referred in the chart as revised).⁵³ The top panel shows the gross saving-to-GNP ratio. The second panel shows the gross private saving-to-GNP ratio. For most years, the revised gross and

Table 1.3 **Sources of Revisions in Selected NIPA Saving Measures (billions of dollars)**

| | 1950 | 1955 | 1960 | 1965 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|--|------|------|------|------|------|------|------|------|------|------|
| <i>Total revision:</i> | | | | | | | | | | |
| Gross saving | 1.8 | .9 | 3.1 | 3.3 | 5.8 | 10.3 | 14.1 | 16.4 | 20.1 | 19.8 |
| Gross private saving | 1.8 | .8 | 3.1 | 3.3 | 5.9 | 10.3 | 14.2 | 16.3 | 19.8 | 20.9 |
| Personal saving | .7 | -.4 | 1.1 | .6 | 1.9 | 5.6 | 8.8 | 10.0 | 11.6 | 10.3 |
| Undistributed corporate profits ^a | 1.0 | 1.7 | 1.8 | 1.3 | 3.1 | 3.6 | 3.9 | 4.7 | 6.8 | 8.0 |
| Capital consumption allowances ^b | .1 | -.4 | .1 | 1.4 | .7 | .9 | 1.5 | 1.6 | 1.5 | 2.5 |
| Government surplus or deficit (-) | 0 | 0 | 0 | 0 | 0 | -.1 | -.1 | .1 | .4 | -1.1 |
| Federal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -.1 | -.1 |
| State and local | 0 | 0 | 0 | 0 | -.1 | 0 | 0 | .1 | .4 | -1.0 |
| <i>Definitional and classificational revision:</i> | | | | | | | | | | |
| Gross saving | 1.3 | 1.6 | 2.1 | 2.1 | 3.2 | 3.8 | 3.9 | 3.9 | 5.2 | 4.8 |
| Gross private saving | 1.3 | 1.6 | 2.1 | 2.1 | 3.2 | 3.8 | 3.9 | 3.9 | 5.3 | 5.1 |
| Personal saving | .5 | .6 | 1.0 | .7 | .7 | 1.0 | .9 | .6 | 1.4 | .8 |
| Undistributed corporate profits ^a | 0 | -.2 | -.4 | -.3 | -.3 | -.2 | -.2 | -.2 | -.3 | -.4 |
| Capital consumption allowances ^b | .8 | 1.1 | 1.5 | 1.7 | 2.7 | 3.0 | 3.2 | 3.5 | 4.1 | 4.7 |
| Government surplus or deficit (-) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -.1 | -.3 |
| Federal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -.1 | -.3 |
| State and local | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(continued)

Table 1.3 (continued)

| | 1950 | 1955 | 1960 | 1965 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|--|------|------|------|------|------|------|------|-------|-------|------|
| <i>Statistical revision:</i> | | | | | | | | | | |
| Gross saving | .5 | -.7 | 1.0 | 1.2 | 2.6 | 6.5 | 10.2 | 12.5 | 14.9 | 15.0 |
| Gross private saving | .5 | -.8 | 1.0 | 1.2 | 2.7 | 6.5 | 10.3 | 12.4 | 14.5 | 15.8 |
| Personal saving | .2 | -1.0 | .1 | -.1 | 1.2 | 4.6 | 7.9 | 9.4 | 10.2 | 9.5 |
| Undistributed corporate profits ^a | 1.0 | 1.9 | 2.2 | 1.6 | 3.4 | 3.8 | 4.1 | 4.9 | 7.1 | 8.4 |
| Capital consumption allowances ^b | -.7 | -1.5 | -1.4 | -.3 | -2.0 | -2.1 | -1.7 | -1.9 | -2.6 | -2.2 |
| Government surplus or deficit (-) | 0 | 0 | 0 | 0 | 0 | -.1 | -.1 | .1 | .5 | -.8 |
| Federal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .2 |
| State and local | 0 | 0 | 0 | 0 | -.1 | 0 | 0 | .1 | .4 | -1.0 |
| <i>Addenda:</i> | | | | | | | | | | |
| Revisions in net foreign investment: | | | | | | | | | | |
| Total | 0 | 0 | .4 | .8 | 1.6 | 2.0 | 2.2 | 2.3 | 2.5 | 3.3 |
| Definitional and classificational | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -.1 | -.3 |
| Statistical | 0 | 0 | .4 | .8 | 1.6 | 2.0 | 2.2 | 2.3 | 2.6 | 3.6 |
| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | |
| <i>Total revision:</i> | | | | | | | | | | |
| Gross saving | 25.1 | 26.3 | 33.8 | 35.7 | 39.1 | 37.7 | 37.6 | 26.4 | 21.5 | |
| Gross private saving | 27.0 | 27.6 | 35.0 | 38.5 | 43.0 | 40.6 | 33.1 | 20.5 | 0 | |
| Personal saving | 13.3 | 12.7 | 20.8 | 21.4 | 26.7 | 22.0 | 17.9 | 12.5 | 12.6 | |
| Undistributed corporate profits ^a | 9.5 | 8.6 | 6.8 | 7.5 | 5.6 | .9 | -9.2 | -11.5 | -24.4 | |
| Capital consumption allowances ^b | 4.1 | 6.3 | 7.4 | 9.8 | 10.7 | 17.6 | 24.3 | 19.5 | 11.9 | |
| Government surplus or deficit (-) | -1.9 | -1.3 | -1.2 | -2.8 | -3.8 | -3.0 | 4.5 | 5.9 | 21.4 | |
| Federal | -.4 | -.1 | .2 | 0 | -.1 | .5 | 2.3 | 2.6 | 5.8 | |
| State and local | -1.4 | -1.1 | -1.4 | -2.8 | -3.8 | -3.5 | 2.2 | 3.4 | 15.6 | |

*Definitional and classificational
revision:*

| | | | | | | | | | |
|--|-----|-----|-----|-----|------|------|------|------|------|
| Gross saving | 5.8 | 6.6 | 9.1 | 9.8 | 10.5 | 11.3 | 10.4 | 11.3 | 15.0 |
| Gross private saving | 6.2 | 6.6 | 8.9 | 9.9 | 10.5 | 11.3 | 10.5 | 11.6 | 15.8 |
| Personal saving | 1.2 | 1.0 | 2.8 | 2.9 | 2.8 | 2.5 | 1.5 | 2.3 | 5.6 |
| Undistributed corporate profits ^a | -.1 | 0 | -.1 | .2 | 0 | 0 | -.3 | -.5 | -.1 |
| Capital consumption allowances ^b | 5.1 | 5.6 | 6.2 | 6.8 | 7.8 | 8.7 | 9.4 | 9.8 | 10.4 |
| Government surplus or deficit (-) | -.5 | 0 | .2 | -.1 | 0 | 0 | -.1 | -.3 | -.8 |
| Federal | -.5 | 0 | .2 | -.1 | 0 | 0 | -.1 | -.3 | -.8 |
| State and local | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Statistical revision:

| | | | | | | | | | |
|--|------|------|------|------|------|------|------|-------|-------|
| Gross saving | 19.3 | 19.7 | 24.7 | 25.9 | 28.6 | 26.4 | 27.2 | 15.1 | 6.5 |
| Gross private saving | 20.8 | 21.0 | 26.1 | 28.6 | 32.5 | 29.3 | 22.6 | 8.9 | -15.8 |
| Personal saving | 12.1 | 11.7 | 18.0 | 18.5 | 23.9 | 19.5 | 16.4 | 10.2 | 7.0 |
| Undistributed corporate profits ^a | 9.6 | 8.6 | 6.9 | 7.3 | 5.6 | .9 | -8.9 | -11.0 | -24.3 |
| Capital consumption allowances ^b | -1.0 | .7 | 1.2 | 3.0 | 2.9 | 8.9 | 14.9 | 9.7 | 1.5 |
| Government surplus or deficit (-) | -1.4 | -1.3 | -1.4 | -2.7 | -3.8 | -3.0 | 4.6 | 6.2 | 22.2 |
| Federal | .1 | -.1 | 0 | .1 | -.1 | .5 | 2.4 | 2.9 | 6.6 |
| State and local | -1.4 | -1.1 | -1.4 | -2.8 | -3.8 | -3.5 | 2.2 | 3.4 | 15.6 |

Addenda:

Revisions in net foreign investment:

| | | | | | | | | | |
|-----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Total | 3.9 | 4.9 | 4.2 | 4.4 | 6.7 | 4.8 | 5.6 | .4 | 2.7 |
| Definitional and classificational | -.5 | 0 | .2 | -.1 | 0 | 0 | -.1 | -.3 | -.8 |
| Statistical | 4.4 | 4.9 | 4.0 | 4.5 | 6.7 | 4.8 | 5.7 | .7 | 3.5 |

Note: The revisions are measured as differences between estimates available when the July 1986 *Survey of Current Business* was published and those available when the November 1985 *Survey* was published.

^aWith inventory valuation and capital consumption adjustments.

^bWith capital consumption adjustment.

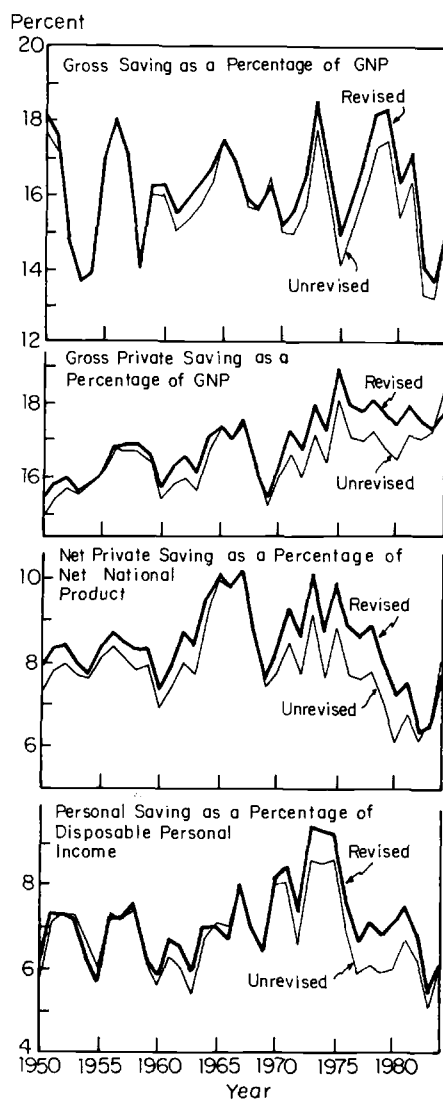


Fig. 1.3

Revised and unrevised NIPA saving measures. *Note:* Revised estimates reflect those available when the July 1986 *Survey of Current Business* was published. Unrevised estimates reflect those available when the November 1985 *Survey* was published.

gross private ratios were higher than the unrevised ratios. The exception was 1984, when the state and local government saving revision affected gross saving but not gross private saving. The revised ratios exceeded the unrevised ratios most during the late 1970s and early 1980s. In addition to level differences, some of the year-to-year changes differed, but most were similar. One difference in changes occurred when the unrevised gross private saving ratio rose from 1982 to 1983, but the revised ratio fell.

In the third panel, the revised net private saving ratio was also higher than the unrevised ratio in most years. As with the gross and gross private ratios, a gap opened between the revised and the unrevised net private saving ratios during the late 1970s and early 1980s. The differences changed sign after 1982.

In the bottom panel, the revised personal saving rate was higher than the unrevised rate in most years and helps explain many of the differences between the revised and the unrevised ratios in the other panels.

A simple decomposition of the revision in the ratios helps attribute the revisions to their major sources. Letting S_r = the revised saving measure (e.g., levels of gross saving, gross private saving, etc.), S_u = the unrevised saving measure, Y_r = the revised base of the ratio (e.g., GNP, disposable personal income), Y_u = the unrevised base of the ratio, $\Delta S = S_r - S_u$, and $\Delta Y = Y_r - Y_u$, then the revision in the ratios can be expressed:

$$(1) \quad \Delta\left(\frac{S}{Y}\right) = \frac{\Delta S}{Y_r} - \left(\frac{S_u}{Y_u}\right)g,$$

where $g = \Delta Y/Y_r$. Letting ΔS^d = definitional and classificational revisions and ΔS^s = statistical revisions, and noting that $\Delta S = \Delta S^d + \Delta S^s$, equation (1) can be rewritten as:

$$(2) \quad \Delta\left(\frac{S}{Y}\right) = \frac{\Delta S^d}{Y_r} + \frac{\Delta S^s}{Y_r} - \left(\frac{S_u}{Y_u}\right)g.$$

The numerators of the first two terms are the revisions shown in table 1.3. Table 1.4 shows all the terms in equation (2) under the "factors" heading as well as the total revisions in the ratios. The denominator change reflects the final term in the equation and is entered with a negative sign so the factors can be summed across to equal the total revisions in the ratios.

The decomposition gives an indication of how much of the revisions in the saving ratios was due to definitional and classificational revisions, how much to statistical revisions, and how much to revisions in the base of the ratios.⁵⁴ Because GNP, net national product, and disposable

Table 1.4 Sources of Revisions in Selected NIPA Saving Ratios (percentage points)

| Year | Gross Saving Ratio ^a | | | | Gross Private Saving Ratio ^a | | | |
|------|---------------------------------|---|-------------|-----------------------|---|---|-------------|-----------------------|
| | Total Revision | Factors | | | Total Revision | Factors | | |
| | | Definitional and Classificational | Statistical | Denominator Change | | Definitional and Classificational | Statistical | Denominator Change |
| 1950 | .5 | .5 | .2 | -.1 | .5 | .5 | .2 | -.1 |
| 1955 | 0 | .4 | -.2 | -.2 | 0 | .4 | -.2 | -.2 |
| 1960 | .3 | .4 | .2 | -.3 | .3 | .4 | .2 | -.3 |
| 1965 | .1 | .3 | .2 | -.3 | .1 | .3 | .2 | -.3 |
| 1970 | .2 | .3 | .3 | -.3 | .2 | .3 | .3 | -.4 |
| 1971 | .6 | .3 | .6 | -.3 | .6 | .3 | .6 | -.4 |
| 1972 | .8 | .3 | .8 | -.3 | .8 | .3 | .8 | -.4 |
| 1973 | .7 | .3 | .9 | -.4 | .8 | .3 | .9 | -.4 |
| 1974 | .9 | .4 | 1.0 | -.4 | .9 | .4 | 1.0 | -.4 |
| 1975 | .8 | .3 | .9 | -.4 | .8 | .3 | 1.0 | -.6 |
| 1976 | .9 | .3 | 1.1 | -.5 | .9 | .3 | 1.2 | -.6 |
| 1977 | .8 | .3 | 1.0 | -.6 | .8 | .3 | 1.1 | -.6 |
| 1978 | .9 | .4 | 1.1 | -.7 | .9 | .4 | 1.2 | -.7 |
| 1979 | .8 | .4 | 1.0 | -.6 | 1.0 | .4 | 1.1 | -.6 |
| 1980 | .9 | .4 | 1.0 | -.6 | 1.0 | .4 | 1.2 | -.6 |
| 1981 | .7 | .4 | .9 | -.5 | .8 | .4 | 1.0 | -.5 |
| 1982 | .8 | .3 | .9 | -.4 | .5 | .3 | .7 | -.5 |
| 1983 | .4 | .3 | .4 | -.4 | .1 | .3 | .3 | -.5 |
| 1984 | .1 | .4 | .2 | -.4 | -.5 | .4 | -.4 | -.5 |

| | Net Private Saving Ratio ^b | | | | | Personal Saving Rate ^c | | |
|------|---------------------------------------|----|-----|-----|-----|-----------------------------------|-----|-----|
| 1950 | .6 | .2 | .4 | 0 | .3 | .2 | .1 | 0 |
| 1955 | .2 | .1 | .2 | -.1 | -.3 | .2 | -.4 | -.1 |
| 1960 | .5 | .1 | .5 | -.1 | .2 | .3 | 0 | -.1 |
| 1965 | .1 | .1 | .2 | -.2 | -.1 | .1 | 0 | -.2 |
| 1970 | .4 | .1 | .5 | -.2 | .1 | .1 | .2 | -.2 |
| 1971 | .8 | .1 | .9 | -.2 | .4 | .1 | .6 | -.3 |
| 1972 | .9 | .1 | 1.1 | -.2 | .8 | .1 | .9 | -.2 |
| 1973 | .9 | 0 | 1.2 | -.2 | .8 | .1 | 1.0 | -.3 |
| 1974 | 1.1 | .1 | 1.3 | -.2 | .8 | .1 | 1.0 | -.3 |
| 1975 | 1.0 | 0 | 1.3 | -.3 | .6 | .1 | .8 | -.4 |
| 1976 | 1.2 | .1 | 1.4 | -.3 | .7 | .1 | 1.0 | -.3 |
| 1977 | 1.0 | .1 | 1.1 | -.3 | .7 | .1 | .8 | -.3 |
| 1978 | 1.1 | .1 | 1.2 | -.3 | 1.0 | .2 | 1.2 | -.3 |
| 1979 | 1.0 | .1 | 1.1 | -.3 | .9 | .2 | 1.1 | -.3 |
| 1980 | 1.1 | .1 | 1.2 | -.2 | 1.1 | .1 | 1.2 | -.3 |
| 1981 | .7 | .1 | .8 | -.2 | .8 | .1 | .9 | -.3 |
| 1982 | .2 | 0 | .3 | -.2 | .6 | .1 | .7 | -.2 |
| 1983 | -.1 | .1 | 0 | -.2 | .4 | .1 | .4 | -.2 |
| 1984 | -.5 | .2 | -.5 | -.2 | .2 | .2 | .3 | -.2 |

Note: The revisions are measured as differences between estimates available when the July 1986 *Survey of Current Business* was published and those available when the November 1985 *Survey* was published.

^aPercentage of gross national product.

^bPercentage of net national product.

^cPercentage of disposable personal income.

personal income were all generally revised upward, the denominator change factor contributed to downward revisions of the ratios in most years. The definitional and classificational revision factor contributed to upward revisions in all years shown, but the magnitudes in most years were considerably less than those related to statistical revisions. The statistical revision factor accounted for most of the revision in the ratios in most years.

In addition to statistical revisions that arise in connection with comprehensive revisions, BEA makes regular annual revisions in July of most years that generally are limited to statistical revisions. In these revisions, estimates for the most recent calendar year and the two preceding calendar years are revised.⁵⁵ After the third revision, the estimate for a given year is not revised again until a comprehensive revision. Table 1.5 shows the provisional estimates for 1980 and 1981 of selected NIPA saving measures as percentages of their value from the 1985 comprehensive revision.⁵⁶ The table also shows comparable estimates for other selected series related to the saving measures. The estimates have been adjusted to account for definitional and classificational revisions in order to isolate statistical revisions. Because the estimates from the comprehensive revision are better estimates of the true magnitude of the saving measure than the provisional estimates, the percentages show how close the provisional estimates came to the better estimates.

Most of the provisional estimates were less than the estimates from the comprehensive revision. The reasons for these level differences were discussed in connection with the comprehensive revision. Table 1.5 enables the determination of whether the provisional estimates move toward the comprehensive revision estimate through successive revisions. Generally, but not always, they do.⁵⁷ In both years, gross saving moved to within 5–6 percent of the comprehensive revision estimate but showed little further revision after the second July revision. Personal saving, capital consumption, and federal saving also moved toward the comprehensive revision estimate. By the third July revision, the federal estimate was almost identical to the comprehensive revision estimate. One saving measure did not fare as well. State and local government saving missed by larger amounts in several of the successive revisions.

The addenda items in the table show some of the major income and outlay items underlying personal saving. These items suggest that part of the reason personal saving moves toward the comprehensive revision estimate is that personal income moves toward its comprehensive revision estimate. This occurs in spite of misses by some of its smaller components.

Table 1.5

Comparison of Selected Provisional NIPA Saving Measures for 1980 and 1981 with Estimates from the 1985 Comprehensive Revision^a

| | 1980 | | | | | 1981 | | | | |
|--|--|-----------|-----------|-----------|---|--|-----------|-----------|-----------|---|
| | Provisional Estimate as a Percent of Comprehensive Revision Estimate | | | | Comprehensive Revision Estimate (billions of dollars) | Provisional Estimate as a Percent of Comprehensive Revision Estimate | | | | Comprehensive Revision Estimate (billions of dollars) |
| | March | First | Second | Third | | March | First | Second | Third | |
| | 1981 | July 1981 | July 1982 | July 1983 | | 1982 | July 1982 | July 1983 | July 1984 | |
| Gross saving | 92.7 | ... | 93.6 | 93.6 | 445.0 | 89.5 | 93.6 | 94.8 | 94.9 | 522.0 |
| Gross private saving | 92.7 | ... | 93.8 | 93.2 | 478.4 | 89.3 | 93.7 | 94.6 | 94.7 | 550.5 |
| Personal saving | 76.0 | ... | 79.6 | 82.5 | 136.9 | 69.1 | 83.2 | 86.4 | 87.8 | 159.4 |
| Undistributed corporate profits ^b | 117.5 | ... | 103.2 | 85.1 | 37.7 | 118.3 | 102.8 | 103.7 | 97.9 | 43.2 |
| Capital consumption allowances ^c | 97.1 | ... | 99.1 | 99.0 | 303.8 | 95.0 | 97.4 | 97.2 | 97.4 | 347.8 |
| Government surplus or deficit (–) | 93.3 | ... | 96.2 | 89.0 | – 34.5 | 86.2 | 94.9 | 90.6 | 90.0 | – 29.7 |
| Federal | 99.8 | ... | 100.2 | 99.8 | – 61.3 | 97.6 | 94.0 | 97.5 | 100.8 | – 63.8 |
| State and local | 108.6 | ... | 105.2 | 114.2 | 26.8 | 107.6 | 93.0 | 103.5 | 110.3 | 34.1 |
| Addenda: | | | | | | | | | | |
| Net foreign investment | 45.4 | ... | 60.0 | 48.5 | 13.0 | 39.6 | 38.7 | 37.7 | 54.7 | 10.6 |
| Personal income | 96.9 | ... | 96.9 | 97.1 | 2,258.5 | 96.6 | 97.1 | 97.9 | 97.6 | 2,520.9 |
| Wages and salaries | 97.9 | ... | 98.8 | 98.9 | 1,372.0 | 98.2 | 98.9 | 98.9 | 98.9 | 1,510.3 |
| Other labor income | 99.1 | ... | 91.9 | 92.5 | 138.4 | 102.5 | 93.4 | 95.5 | 93.1 | 150.3 |
| Nonfarm proprietors income ^b | 67.2 | ... | 60.8 | 60.0 | 160.1 | 72.4 | 64.9 | 57.8 | 60.4 | 156.1 |
| Personal interest income | 93.7 | ... | 96.3 | 97.3 | 271.9 | 91.6 | 97.7 | 101.4 | 98.5 | 335.4 |
| Outlays | 97.8 | ... | 97.7 | 97.7 | 1,781.1 | 98.3 | 97.8 | 98.5 | 98.1 | 1,968.1 |
| Personal consumption expenditures | 97.8 | ... | 97.5 | 97.5 | 1,732.6 | 98.3 | 97.6 | 98.3 | 97.9 | 1,915.1 |
| Corporate profits ^b | 103.0 | ... | 102.5 | 99.0 | 177.2 | 102.2 | 101.4 | 102.3 | 101.0 | 188.0 |

^aProvisional estimates are adjusted for definitional and classificational revisions.

^bWith inventory value adjustments and capital consumption adjustments.

^cWith capital consumption adjustments.

1.3.3 An Assessment of the Revisions

Two important questions to consider in assessing revisions are, Were the revisions large enough to change the prior view of saving patterns? Did the revisions improve the analytic usefulness and quality of the measures? In response to the first question, the trends in current measures discussed earlier were essentially the same as those prior to the 1985 comprehensive revision. However, figure 1.3 did show some differences resulting mainly from revisions in personal saving. Specifically, the personal saving rate rose by considerably more in the early 1970s than had appeared to be the case in the prior estimates. The rate then fell considerably more from the early 1970s to the early 1980s. Consequently, the revised estimates did not differ in indicating direction, but they did differ considerably in magnitude. Because the magnitudes are of considerable importance, the size of the revisions implies that the measures must be used cautiously.

In response to the second question, it is useful to discuss definitional and classificational revisions and statistical revisions separately. The definitional and classificational revisions discussed earlier covered three comprehensive revisions. The incorporation in 1976 of economic capital consumption in place of tax-return-based depreciation clearly improved the analytic usefulness of the NIPAs. The revision provided a much clearer picture of the actual consumption of fixed capital than had been provided before. The other major definitional and classificational revisions affecting saving related to capitalizing items that had been treated as current purchases and to changing the treatment of various foreign transactions. In both cases, the revisions improved the consistency of treatments within the NIPAs. Further, many of these revisions were made to provide a more accurate reflection of what transactors view as investment. Consequently, these revisions improved the analytic usefulness of NIPA investment measures and the accompanying saving measures.

With respect to statistical revisions, new source data improve the quality of NIPA estimates because these new data provide more complete coverage and more detailed information. However, the major statistical revision in the 1985 comprehensive revision resulted from methodological changes concerning improved adjustments for misreporting on tax returns. The improved adjustments represent a significant improvement in NIPA coverage of underground economic activities. Although the initial introduction of these improved adjustments accounted for relatively large statistical revisions, future revisions to the adjustments are not likely to be large.

An evaluation of the improved adjustments is in Parker (1984a); several possible sources of error were discussed. The sources of error

mainly concerned the unavailability of information to make additional adjustments, the unavailability of information to evaluate IRS findings on the degree of underreporting, assorted limitations with some of the data used, and limitations in extending the estimates to years not covered in the initial work. The evaluation concluded that the sign of the combined sources of error was indeterminate.

1.4 Limitations and Alternatives

NIPA saving measures and important conventions contributing to them have been criticized on a number of counts. Often, these criticisms are accompanied by suggestions for alternative measures. In this section, some of the criticisms and limitations are discussed along with some possible alternatives. Five groups of issues are discussed: extensions of the NIPA accounting framework, extensions of the NIPA production boundary, more consistent treatments with respect to pensions, current purchases versus capitalization, and adjustments and alternatives to government saving measures. There are obviously some overlaps among the five groups; these interrelations will be noted.

1.4.1 Extensions of the NIPA Accounting Framework

It has been noted that saving in the NIPAs is linked to NIPA concepts of current production, which, for example, exclude capital gains and losses. However, for many types of analyses, saving measures should take these gains or losses into account.⁵⁸ One way to address both realized and unrealized capital gains and losses is to develop national (including sector) balance sheets and to calculate changes in net worth.

The development of balance sheets that are entirely consistent with the NIPAs has been considered an important goal for many years.⁵⁹ However, at present, only estimates of fixed capital and inventories are available, and complete balance sheets have not been developed. To the extent that net worth and other balance sheet measures have important effects on saving behavior, NIPA saving measures are limited in their usefulness in some behavioral studies.

Others have done additional work on U.S. balance sheets. The work of the Board of Governors of the Federal Reserve System (1987), Ruggles and Ruggles (1982b, 1985), Goldsmith (1985), Eisner (1986), and others may be cited. In all cases, however, there are conceptual and statistical differences between these measures and those that would be entirely consistent with the NIPAs.⁶⁰

Developing balance sheets for the household sector has been viewed as particularly important. The household sector balance sheets that have been constructed by others generally are not consistent with NIPA

measures because of various sectoring, attribution, and classification differences. For example, the Ruggleses' integrated economic accounts (IEA) differ in the treatments of nonprofit institutions serving individuals, owner-occupied housing, pension fund attributions, and many other conventions (Ruggles and Ruggles 1982b). Consequently, the relation between IEA saving and changes in IEA household sector net worth may not be indicative of the relation between NIPA personal saving and the corresponding change in net worth from balance sheets entirely consistent with NIPA concepts and conventions. Nevertheless, it is interesting to note that capital gains accounted for about 80 percent of the change in the Ruggleses' household sector net worth measure during the 1947–80 period. In their measure, capital gains were calculated on owner-occupied houses, land, consumer durables, corporate stock, and other equities.

In a recent study by Peek (1986), it is suggested that NIPA personal saving has been a poor indicator of changes in household net worth. Specifically, the declines in the personal saving rate noted earlier were offset by capital gains. If households are primarily concerned about their levels of net worth, then NIPA personal saving is only part of the picture. Because changes in the NIPA personal saving rate may reflect only offsetting changes in capital gains or losses rather than significant changes in desired wealth accumulation, it may be appropriate for BEA to extend the NIPA accounting framework to include balance sheets and estimates of net worth. Unfortunately, there are major data limitations associated with such a project. Additional comments on limitations in NIPA saving measures related to extensions of the accounting framework are provided later in connection with adjustments to government saving measures.

1.4.2 Extensions of the NIPA Production Boundary

There have been numerous criticisms of the present NIPA production boundary and many suggestions for changes. Nearly all extensions would involve some effects on NIPA saving measures, but the magnitudes (even the signs in some cases) are often difficult to determine. Two extensions are discussed briefly below: more extensive coverage of nonmarket activity and the inclusion of illegal activity.

The extension of the NIPA production boundary to include a broader range of nonmarket activities primarily focuses on the household sector and is mainly suggested to improve the NIPAs as measures of economic welfare (Juster 1973; Eisner 1985).⁶¹ The suggested extensions involve imputations of the value of various types of activities. Among the most important are the value of housework and do-it-yourself work. Incorporating these types of imputations would increase aggregate income

and outlays equally and have no effect on the level of gross saving. However, the gross saving rate would be reduced. In estimates by Kendrick (1979), these nonmarket activities were valued at about one-fourth of NIPA GNP. Consequently, a saving rate with such expanded GNP in the denominator would be reduced significantly.

The criticisms of adding these types of imputations center on the obvious distortions to the NIPAs as measures of market activity and on the lack of agreement on the statistical procedures to measure non-market activities (Okun 1971; Jaszi 1971). With respect to saving measures, the extension of the production boundary to include these types of activities would make saving rates much more difficult to interpret.

In addition to these imputations, it has been suggested that some expenditures that are now treated as current purchases should be capitalized and an imputed flow of services could be attributed to them. Consumer durable goods are frequently mentioned for this treatment. This change would increase gross saving and is discussed later in connection with current purchases versus capitalization.

Because illegal activities have grown in importance, the extension of the production boundary to include them has been discussed (Adler 1982; Carson 1984a, 1984b). The activities that are viewed as potentially large include trade in narcotics, prostitution, and gambling. Reliable source data on these activities are not available; consequently, estimates of the level of illegal income and outlays are extremely speculative. Based on a survey of studies by Carson (1984a), illegal source income was estimated to be equivalent to 1–7 percent of GNP.

The effects on NIPA saving measures of including illegal activities are not clear. It has been suggested that NIPA personal saving is understated because of the exclusion of illegal activities, but it is more likely that the level of NIPA saving is unaffected.⁶² If income were reported in laundered form (e.g., a prostitute reporting part of illegal income as modeling fees on IRS schedule C), then NIPA income could include some of the illegal income. However, in this case, the estimate of PCE for services relies on the same source data and would be misstated by the same amount. It is more likely that both income and outlays for illegal activities are not recorded. In these cases, income and outlays probably would be increased by equal amounts leaving the level of saving unchanged.

Under scenarios in which the level of saving remains unchanged, saving rates would unambiguously decline with the inclusion of illegal activities because the denominators of the ratios would increase. Under a scenario in which the level of saving increases, the saving rate may not increase if the accompanying increases in the denominator are large enough.

1.4.3 More Consistent Treatments with Respect to Pensions

It was noted earlier that pension funds play important roles in NIPA saving measures and that public and private pension funds are treated differently. While social security is dissimilar to private pension funds in many respects, state and local government pension funds and private pension funds are more similar. For this reason, NIPA private saving measures have sometimes been criticized for excluding state and local government pension fund saving, which could be attributed to persons.⁶³ This treatment would change personal saving and government saving by equal amounts with opposite signs. Disposable personal income would change by an amount equal to the change in personal saving. Gross saving would not be affected. The adjustments to personal saving are shown in equation (3); they do not make changes to the treatment of operating expenses:⁶⁴

$$(3) \quad \Delta PS = EC + PC + DIV + INT - TP,$$

where

ΔPS = the change in personal saving associated with attributing state and local government pension fund saving to persons;

EC = employer contributions for state and local government employee retirement;

PC = personal contributions for state and local government employee retirement;

DIV = dividends received by state and local government pension funds;

INT = interest earnings received by state and local government pension funds; and

TP = transfer payments to persons from state and local government pension funds.

Table 1.6 shows estimates of the effects on personal saving and personal saving rates. In addition to the state and local government pension attribution, the table also shows a similar attribution of federal civilian pension fund saving.⁶⁵ The same operations in equation (3) are used for the federal estimates by substituting "federal" for "state and local" in the descriptions of the variables and omitting the DIV term. The attribution of state and local and selected federal pension fund saving to persons would increase personal saving by about \$58 billion in 1985 and result in an increase in the personal saving rate of about 1.9 percentage points.

Figure 1.4 shows estimates of the personal saving rate after attributing selected government pension fund saving to persons. In most years, the state and local attribution accounts for all but about

Table 1.6 **Effects of Attributing Saving of Selected Government Pension Funds to Persons**

| Year | Adjustment to Personal Saving Resulting from the Attribution ^a (billions of dollars) | | | Personal Saving as a Percentage of Disposable Personal Income after the Attribution ^a | | | Currently Published Personal Saving as a Percentage of Disposable Personal Income |
|------|---|--|-----------------------|--|--|-----------------------|---|
| | Combined Government Pension Funds | State and Local Government Pension Funds | Federal Pension Funds | Combined Government Pension Funds | State and Local Government Pension Funds | Federal Pension Funds | |
| 1960 | 3.2 | 2.3 | 1.0 | 6.6 | 6.4 | 6.1 | 5.8 |
| 1961 | 3.5 | 2.5 | 1.0 | 7.5 | 7.3 | 6.9 | 6.6 |
| 1962 | 3.7 | 2.6 | 1.1 | 7.4 | 7.2 | 6.8 | 6.5 |
| 1963 | 4.0 | 2.8 | 1.1 | 6.8 | 6.6 | 6.2 | 5.9 |
| 1964 | 4.4 | 3.2 | 1.3 | 7.9 | 7.6 | 7.2 | 7.0 |
| 1965 | 4.6 | 3.4 | 1.2 | 7.9 | 7.7 | 7.3 | 7.0 |
| 1966 | 5.1 | 3.9 | 1.1 | 7.7 | 7.5 | 7.0 | 6.8 |
| 1967 | 6.0 | 4.8 | 1.2 | 9.0 | 8.8 | 8.2 | 8.0 |
| 1968 | 6.5 | 5.2 | 1.3 | 8.0 | 7.8 | 7.2 | 7.0 |
| 1969 | 7.3 | 5.8 | 1.5 | 7.5 | 7.2 | 6.6 | 6.4 |
| 1970 | 9.1 | 6.9 | 2.2 | 9.2 | 8.9 | 8.3 | 8.1 |
| 1971 | 9.9 | 7.5 | 2.4 | 9.7 | 9.4 | 8.8 | 8.5 |
| 1972 | 11.0 | 8.6 | 2.4 | 8.5 | 8.2 | 7.6 | 7.3 |
| 1973 | 11.6 | 9.5 | 2.1 | 10.5 | 10.3 | 9.6 | 9.4 |

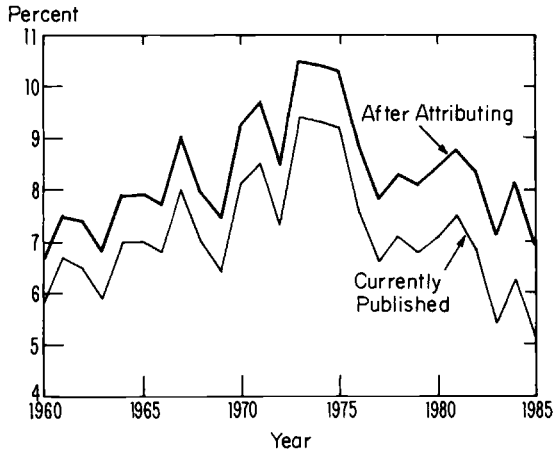
(continued)

Table 1.6 (continued)

| Year | Adjustment to Personal Saving Resulting from the Attribution ^a (billions of dollars) | | | Personal Saving as a Percentage of Disposable Personal Income after the Attribution ^a | | | Currently Published Personal Saving as a Percentage of Disposable Personal Income |
|------|---|--|-----------------------|--|--|-----------------------|---|
| | Combined Government Pension Funds | State and Local Government Pension Funds | Federal Pension Funds | Combined Government Pension Funds | State and Local Government Pension Funds | Federal Pension Funds | |
| 1974 | 12.7 | 10.8 | 1.9 | 10.4 | 10.2 | 9.5 | 9.3 |
| 1975 | 14.4 | 12.8 | 1.6 | 10.3 | 10.2 | 9.3 | 9.2 |
| 1976 | 16.8 | 15.2 | 1.5 | 8.9 | 8.8 | 7.8 | 7.6 |
| 1977 | 18.5 | 17.2 | 1.3 | 7.8 | 7.7 | 6.7 | 6.6 |
| 1978 | 20.2 | 19.0 | 1.1 | 8.3 | 8.2 | 7.2 | 7.1 |
| 1979 | 24.0 | 22.3 | 1.8 | 8.1 | 8.0 | 6.9 | 6.8 |
| 1980 | 27.2 | 26.0 | 1.2 | 8.4 | 8.4 | 7.2 | 7.1 |
| 1981 | 30.2 | 29.0 | 1.1 | 8.8 | 8.7 | 7.5 | 7.5 |
| 1982 | 38.1 | 36.1 | 2.0 | 8.4 | 8.3 | 6.9 | 6.8 |
| 1983 | 45.3 | 42.4 | 3.0 | 7.1 | 7.0 | 5.5 | 5.4 |
| 1984 | 52.7 | 48.1 | 4.6 | 8.1 | 8.0 | 6.5 | 6.3 |
| 1985 | 58.0 | 51.6 | 6.4 | 7.0 | 6.8 | 5.3 | 5.1 |

Note: Selected government pension funds consist primarily of civilian government employee retirement funds.

^aDoes not include an adjustment for administrative expenses, which would slightly lower the attribution.

**Fig. 1.4**

Personal savings as a percentage of disposable personal income, currently published and after attributing saving of selected government pension fund to persons. *Note:* Selected government pension funds primarily consist of civilian government employee retirement funds.

0.1–0.2 percentage points of the difference between the currently published rate and the rate after attributing the pension fund saving. After the attribution, most of the short-term patterns of the personal saving rate would remain the same as those of the currently published rate because state and local pension fund saving has grown smoothly. For this reason, however, the trends over longer periods differ somewhat. The decline since the mid-1970s in the modified rate is a little less pronounced. Consequently, to the extent that state and local pension funds are viewed by the employees in the same way as private pension funds, the decline in personal saving may be less pronounced than the current measures suggest.

1.4.4 Current Purchases versus Capitalization

NIPA saving measures have often been criticized on the ground that they underestimate saving by classifying some purchases that reflect investment as current purchases. Some critics have suggested very broad views of what constitutes investment. Such things as research and development, education, and health care are mentioned (Hawrylyshyn 1974; Eisner 1985). If such items were capitalized, NIPA saving would rise very substantially. For example, Eisner (1985) estimated gross investment in these three items alone at about \$850 billion in 1981—considerably more than published NIPA gross saving in that year. However, there are numerous problems with such a broad view of investment (Jaszi 1971, 1973). One of the most important problems

is that there is no consensus on how to measure capital consumption or other elements of the service flow for intangible capital.

A somewhat narrower view of the scope of investment is that it should be broadened to include government capital formation and consumer durable goods.⁶⁶ The treatment of government capital formation as NIPA investment would involve the following changes to government receipts, expenditures, and the surplus or deficit:⁶⁷

$$(4) \quad E^* = E - I_g + V_g - M_g,$$

$$(5) \quad R^* = R + V_g - M_g - D_g,$$

$$(6) \quad SU^* = R - E + I_g - D_g,$$

where

E^* = government expenditures adjusted for the treatment of government capital formation as NIPA investment;

E = current government expenditures;

I_g = government investment;

V_g = service value of government capital;

M_g = expenditures for maintenance and repair of government capital;

D_g = capital consumption of government capital;

R^* = government receipts adjusted for the treatment of government capital formation as NIPA investment;

R = current government receipts; and

SU^* = government surplus or deficit adjusted for the treatment of government capital formation as NIPA investment.

Gross saving would change by the amount classified as NIPA investment (I_g), and GNP would change by the difference between service value (V_g) and maintenance and repair expenditures (M_g).

The treatment of consumer durable goods would be analogous:⁶⁸

$$(7) \quad DPI^* = DPI + V_c - M_c - i_c - D_c,$$

$$(8) \quad O^* = O - I_c + V_c - M_c - i_c,$$

$$(9) \quad PS^* = DPI - O + I_c - D_c,$$

where

DPI^* = disposable personal income adjusted for the treatment of consumer durable goods as NIPA investment;

DPI = current disposable personal income;

V_c = service value of consumer durable goods;

M_c = expenditures for maintenance and repair of consumer durable goods;

- i_c = interest paid on credit-financed consumer durable goods;
- D_c = capital consumption of consumer durable goods;
- O^* = outlays adjusted for the treatment of consumer durable goods as NIPA investment;
- O = current outlays;
- I_c = investment in consumer durable goods; and
- PS* = personal saving adjusted for the treatment of consumer durable goods as NIPA investment.

Gross saving would change by the amount classified as NIPA investment (I_c), and GNP would change by the difference between service value (V_c) and maintenance and repair expenditures (M_c).

For both government capital and consumer durable goods, estimates of capital consumption are regularly produced by the BEA (Musgrave 1979, 1980, 1986a, 1986b). The service value of government capital (Martin, Landefeld, and Peskin 1982) and of consumer durable goods (Katz 1982) was estimated annually for 1947–79 but is not regularly updated. It is widely recognized that measures of capital consumption and service value for these types of capital are extremely difficult to estimate.

Figure 1.5 shows current saving ratios and saving ratios adjusted for government and consumer durables capitalization.⁶⁹ The top two panels show the effects of modifying the treatment of government capital. The top panel shows the government surplus or deficit as a percentage of GNP. The effect of the modified treatment is to move the government saving ratio toward surplus. The movements are especially pronounced during the 1960s. The differences between the gross saving ratios in the middle panel show patterns similar to the differences between the surplus/deficit ratios. The differences become much more narrow toward the end of the period.

The bottom panel of the chart shows the effects of modifying the treatment of consumer durable goods. In most years, the modified personal saving rate is one or more percentage points higher than the currently published rate. The largest differences occur during the early part of the period, when the net stock of consumer durables was growing rapidly.

1.4.5 Adjustments and Alternatives to Government Saving Measures

Unlike other components of gross saving, NIPA government saving measures are unique in that they are often used as indicators of fiscal policy. It is in the context of this use that adjustments to the government saving measures are often suggested. The federal surplus or deficit, in particular, is the focus of most of the attention. Some of the major

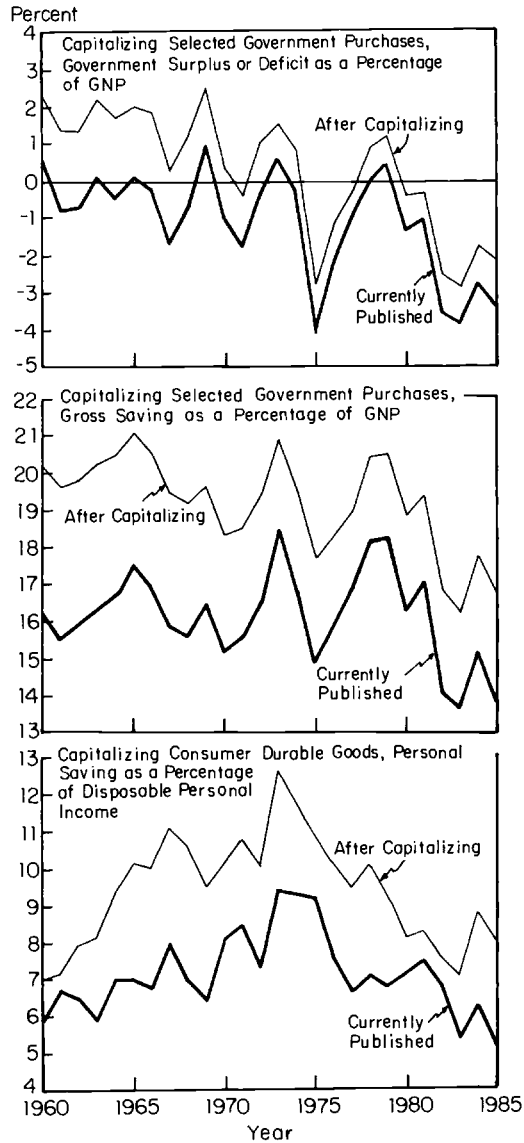


Fig. 1.5

Selected NIPA saving measures, currently published and after capitalizing selected government purchases or consumer durable goods

criticisms concern the cyclical sensitivity of the federal measure, the failure of the federal measure to distinguish between current and capital transactions, the failure of the federal measure to treat the effects of inflation properly, and the failure of the federal measure to include estimates of federal unfunded liabilities (Boskin 1982; Eisner and Pieper 1984; Boskin 1986; Eisner 1986). In many of these cases, the criticisms concern analytic uses of the NIPA measures rather than the measures themselves.

The cyclical sensitivity of the NIPA federal surplus or deficit undermines its usefulness as an indicator of discretionary fiscal policy. The reason is that many of its changes reflect automatic responses to economic fluctuations rather than budget decisions. To overcome this limitation, the cyclically adjusted budget was developed.⁷⁰ The cyclically adjusted budget removes automatic cyclical effects from the NIPA federal budget estimates. The resulting cyclically adjusted estimates are regularly published by BEA. Figure 1.6 shows actual and cyclically adjusted estimates of the federal surplus or deficit-to-GNP ratios.⁷¹ The cyclically adjusted measure dampens the variation in the ratio during most of the period but does not have much effect on the trends. A particularly important point is that very little of the rising deficit-to-GNP ratio in the 1980s could be attributed to the business cycle.

The cyclically adjusted budget does not address some of the other criticisms. BEA's decision not to treat government capital formation

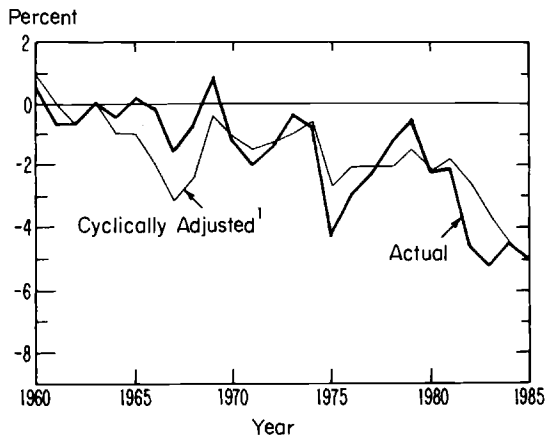


Fig. 1.6

Actual and cyclically adjusted NIPA federal surplus or deficit as a percentage of GNP. ¹Cyclically adjusted federal surplus or deficit as a percentage of middle-expansion trend GNP.

as investment is an example. The other criticisms mentioned relate mainly to limitations in coverage or accounting procedures. Boskin (1982) argued that alternative measures should address unfunded liabilities of social insurance funds, federal loan guarantees, and other items related to future spending commitments. Further, federal balance sheet concepts, such as revaluations of land and mineral rights, can have important policy effects and should be incorporated into federal fiscal measures.

Eisner and Pieper (1984) and Eisner (1986) have suggested that changes in the real value of federal net debt provide a more analytically meaningful view of the effects of fiscal policy than either the actual or the cyclically adjusted federal surplus or deficit. Their measures rely on balance sheet concepts and adjust outstanding federal debt from par to market, from gross to net, and from nominal to real debt. They point out that their measures suggest that federal fiscal policy was much less stimulative during the late 1970s and early 1980s than NIPA saving measures would suggest. Their measures show strong stimulus after 1982.

Along the same lines of research, BEA regularly publishes estimates of cyclically adjusted debt at par value and at market value (de Leeuw and Holloway 1983). In many respects, changes in the cyclically adjusted debt-to-GNP ratio provide the same type of information as the Eisner-Pieper work. The BEA estimates have indicated strong fiscal stimulus in recent years.

In addition to the alternative federal measures estimated by BEA, an alternative state and local measure is also prepared (Levin 1984, 1986). The alternative measure attempts to adjust the NIPA state and local surplus or deficit to reflect more closely what a state or local government finance officer would view as the combined general and special funds surplus or deficit. The alternative measure adjusts the NIPA state and local surplus or deficit by excluding social insurance fund transactions, excluding capital expenditures except those funded from current receipts, and including financial transactions.

1.5 Concluding Remarks

NIPA saving measures are part of a broader economic accounting framework that is primarily designed to measure current production and to show the economic processes associated with the production, distribution, and use of the nation's output. Consequently, NIPA saving measures are shaped by many concepts and conventions governing the broader accounting framework. Within this broader framework, NIPA saving measures show the level and composition of gross saving that

frees resources for NIPA gross investment. While such estimates of saving have proven to be highly useful, there are a number of limitations, and, as a result, the estimates have been subject to much criticism.

Some criticisms or possible alternatives, such as those related to inadequate coverage of nonmarket or illegal activities, are directed at the broader NIPA framework and not at saving measures *per se*. Responding to these criticisms would require significant changes to many entries throughout the NIPAs.

Other criticisms or possible alternatives, such as those related to attributions of pension fund activities or reclassifications of current purchases as investment, focus mainly on how to attribute saving among sectors or what constitutes saving and investment. Responding to these criticisms would require mainly rearranging the present NIPAs and possibly adding a few new entries. However, in some cases, the resulting NIPA measures of output and investment would probably be less useful for analyzing short-run developments in the economy.

Finally, some criticisms or possible alternatives, such as those related to balance sheets or the cyclical sensitivity of government saving measures, focus mainly on extensions, but not alterations, of the present NIPA framework or measures. Responding to these criticisms would require mainly producing additional measures.

Because most of these criticisms or suggested alternatives arise in connection with various analytic uses of NIPA saving measures, it is obvious that present NIPA measures are not appropriate for all uses. Perhaps BEA should respond to these concerns by both emphasizing the limitations of the measures and providing alternative measures as supplements to the present measures. Because alternative uses call for alternative saving measures, it would be desirable for BEA to publish several variant saving measures regularly. Obvious candidates would include variants that treat consumer durables and government capital as investment. Because of uncertainty surrounding the estimation of these variants (e.g., the estimation of the service value of these types of purchases), it would be appropriate to show these variants in special tables rather than integrating them into the NIPAs. This, of course, is the current method of presenting the cyclically adjusted budget and some of the other government saving variants.

With respect to the treatment of government pension funds, perhaps something more would be appropriate. It has been noted that several government pension funds, particularly those administered by state and local governments, are extremely similar to private pension funds whose earnings are attributed to persons. It would be desirable to make additional attributions, at least for the state and local government funds, a part of regular NIPA estimates. The change in treatment could be made as part of the 1990 comprehensive revision.

Appendix A

Summary NIPAs, 1985

The five-account summary, discussed briefly in the main text and accompanying footnotes, provides an overview of the NIPA accounting framework and serves as an organizing framework for more detailed estimates. Table 1.A.1 shows the accounts. The interrelations among the accounts are shown by the parenthetical numbers following individual items. These numbers reflect the location of counterentries elsewhere in the five-account summary.

The role of the five-account summary as an organizing framework for more detailed estimates can be illustrated by example. Account 2 shows personal income and outlays. In the *Survey of Current Business*, NIPA table 2.1 shows a slight variant of account 2; other NIPA tables beginning with "2" provide additional variants or more detailed estimates related to personal income and outlays. In the July 1986 *Survey*, that amounted to nine tables. Complete discussions of the five-account summary are in Jaszi and Carson (1979), Carson and Jaszi (1981), Young and Tice (1985), and Bureau of Economic Analysis (1985b).

Appendix B

Notes on Sources and Methods

Underlying NIPA Saving Measures

The most important components of gross saving are personal saving, undistributed corporate profits with IVA and CCA_{adj}, capital consumption, and the government surplus or deficit. The other measures of saving discussed earlier are simply combinations of these components. To complete the saving picture, net foreign investment also plays an important role for the reasons discussed earlier. The sources and methods underlying these saving and investment measures are discussed in turn.

The components of personal income and outlays underlying personal saving are shown in Appendix A, NIPA summary account 2.⁷² On the outlay side, the two largest entries are PCE and personal tax and nontax payments. On the income side, wages and salaries is the largest entry. Other relatively large entries are other labor income, proprietors' income with IVA and CCA_{adj}, personal interest income, and transfer payments. Personal contributions for social insurance is also a relatively large entry that is deducted on the income side.

Annual estimates of these components depend on a large number of data sources. Table 1.B.1 shows some of the major data sources used

Table 1.A.1 Summary NIPAs, 1985

| Account 1—NIPA (billions of dollars) | | | | | |
|--------------------------------------|--|---------|------|---|---------|
| Line | | | Line | | |
| 1 | Compensation of employees | 2,368.2 | 27 | Personal consumption expenditures (2–3) | 2,600.5 |
| 2 | Wage and salaries | 1,965.8 | 28 | Durable goods | 359.3 |
| 3 | Disbursements (2–7) | 1,966.1 | 29 | Nondurable goods | 905.1 |
| 4 | Wage accruals less disbursements (3–12) and (5–4) | – .2 | 30 | Services | 1,336.1 |
| 5 | Supplements to wages and salaries | 402.4 | 31 | Gross private domestic investment (5–1) | 661.1 |
| 6 | Employer contributions for social insurance (3–20) | 205.5 | 32 | Fixed investment | 650.0 |
| 7 | Other labor income (2–8) | 196.9 | 33 | Nonresidential | 458.2 |
| 8 | Proprietors' income with inventory valuation and capital consumption adjustments (2–9) | 254.4 | 34 | Structures | 154.8 |
| | | | 35 | Producers' durable equipment | 303.4 |
| 9 | Rental income of persons with capital consumption adjustment (2–10) | 7.6 | 36 | Residential | 191.8 |
| | | | 37 | Change in business inventories | 11.1 |
| 10 | Corporate profits with inventory valuation and capital consumption adjustments | 280.7 | 38 | Net exports of goods and services | – 78.9 |
| | | | 39 | Exports (4–1) | 369.8 |
| 11 | Profits before tax | 223.2 | 40 | Imports (4–3) | 448.6 |

(continued)

Table 1.A.1 (continued)

| | | | | | |
|----|--|---------|----|--|---------|
| 12 | Profits tax liability (3–17) | 91.8 | 41 | Government purchases of goods and services (3–1) | 815.4 |
| 13 | Profits after tax | 131.4 | 42 | Federal | 354.1 |
| 14 | Dividends (2–12) | 81.6 | 43 | National defense | 259.4 |
| 15 | Undistributed profits (5–6) | 49.8 | 44 | Nondefense | 94.7 |
| 16 | Inventory valuation adjustment (5–7) | – .6 | 45 | State and local | 461.3 |
| 17 | Capital consumption adjustment (5–8) | 58.1 | | | |
| 18 | Net interest (2–15) | 311.4 | | | |
| 19 | National income | 3,222.3 | | | |
| 20 | Business transfer payments (2–20) | 20.9 | | | |
| 21 | Indirect business tax and nontax liability (3–18) | 331.4 | | | |
| 22 | Less subsidies less current surplus of government enterprises (3–11) | 8.2 | | | |
| 23 | Charges against net national product | 3,566.5 | | | |
| 24 | Capital consumption allowances with capital consumption adjustment (5–9) | 437.2 | | | |
| 25 | Charges against gross national product | 4,003.7 | | | |
| 26 | Statistical discrepancy (5–12) | – 5.5 | | | |
| | Gross National Product | 3,998.1 | | Gross national product | 3,998.1 |

Account 2—Personal Income and Outlay Account (billions of dollars)

| Line | | | Line | | |
|------|--|----------------|------|--|----------------|
| 1 | Personal tax and nontax payments (3–16) | 486.5 | 7 | Wage and salary disbursements (1–3) | 1,966.1 |
| 2 | Personal outlays | 2,684.7 | 8 | Other labor income (1–7) | 196.9 |
| 3 | Personal consumption expenditures (1–27) | 2,600.5 | 9 | Proprietors' income with inventory valuation and capital consumption adjustments (1–8) | 254.4 |
| 4 | Interest paid by consumers to business (2–18) | 82.6 | 10 | Rental income of persons with capital consumption adjustment (1–9) | 7.6 |
| 5 | Personal transfer payments to foreigners (net) (4–5) | 1.6 | 11 | Personal dividend income | 76.4 |
| 6 | Personal saving (5–3) | 143.3 | 12 | Dividends (1–14) | 81.6 |
| | | | 13 | Less dividends received by government (3–10) | 5.2 |
| | | | 14 | Personal interest income | 476.2 |
| | | | 15 | Net interest (1–18) | 311.4 |
| | | | 16 | Interest paid by government to persons and business (3–7) | 173.4 |
| | | | 17 | Less interest received by government (3–9) | 91.1 |
| | | | 18 | Interest paid by consumers to business (2–4) | 82.6 |
| | | | 19 | Transfer payments to persons | 487.1 |
| | | | 20 | From business (1–20) | 20.9 |
| | | | 21 | From government (3–3) | 466.2 |
| | | | 22 | Less personal contributions for social insurance (3–21) | 150.2 |
| | Personal taxes, outlays, and saving | <u>3,314.5</u> | | Personal income | <u>3,314.5</u> |

(continued)

Table 1.A.1 (continued)

| Account 3—Government Receipts and Expenditures Account (billions of dollars) | | | | | |
|--|---|---------|------|---|---------|
| Line | | | Line | | |
| 1 | Purchases of goods and services (1–41) | 815.4 | 16 | Personal tax and nontax payments (2–1) | 486.5 |
| 2 | Transfer payments | 479.5 | 17 | Corporate profits tax liability (1–12) | 91.8 |
| 3 | To persons (2–21) | 466.2 | 18 | Indirect business tax and nontax liability (1–21) | 331.4 |
| 4 | To foreigners (net) (4–6) | 13.4 | 19 | Contributions for social insurance | 355.7 |
| 5 | Net interest paid | 103.6 | 20 | Employer (1–6) | 205.5 |
| 6 | Interest paid | 194.7 | 21 | Personal (2–22) | 150.2 |
| 7 | To persons and business (2–16) | 173.4 | | | |
| 8 | To foreigners (4–7) | 21.3 | | | |
| 9 | Less interest received by government (2–17) | 91.1 | | | |
| 10 | Less dividends received by government (2–13) | 5.2 | | | |
| 11 | Subsidies less current surplus of government enterprises (1–22) | 8.2 | | | |
| 12 | Less wage accruals less disbursements (1–4) | – .2 | | | |
| 13 | Surplus or deficit (–), NIPAs (5–10) | – 136.3 | | | |
| 14 | Federal | – 198.0 | | | |
| 15 | State and local | 61.7 | | | |
| | Government expenditures and surplus | 1,265.4 | | Government receipts | 1,265.4 |

Account 4—Foreign Transactions Account (billions of dollars)

| Line | | | Line | | |
|------|---|-------|------|---|----------------|
| 1 | Exports of goods and services (1–39) | 369.8 | 3 | Imports of goods and services (1–40) | 448.6 |
| 2 | Capital grants received by the United States (net) (5–11) | 0 | 4 | Transfer payments to foreigners (net) | 15.0 |
| | | | 5 | From persons (net) (2–5) | 1.6 |
| | | | 6 | From government (net) (3–4) | 13.4 |
| | | | 7 | Interest paid by government to foreigners (3–8) | 21.3 |
| | | | 8 | Net foreign investment (5–2) | <u>– 115.2</u> |
| | Receipts from foreigners | 369.8 | | Payments to foreigners | 369.8 |

Account 5—Gross Saving and Investment Account (billions of dollars)

| Line | | | Line | | |
|------|--|---------|------|--|--------------|
| 1 | Gross private domestic investment (1–31) | 661.1 | 3 | Personal saving (2–6) | 143.3 |
| 2 | Net foreign investment (4–8) | – 115.2 | 4 | Wage accruals less disbursements (1–4) | 0 |
| | | | 5 | Undistributed corporate profits with inventory valuation and capital consumption adjustments | 107.3 |
| | | | 6 | Undistributed corporate profits (1–15) | 49.8 |
| | | | 7 | Inventory valuation adjustment (1–16) | – .6 |
| | | | 8 | Capital consumption adjustment (1–17) | 58.1 |
| | | | 9 | Capital consumption allowances with capital consumption adjustment (1–24) | 437.2 |
| | | | 10 | Government surplus or deficit (–), NIPA (3–13) | – 136.3 |
| | | | 11 | Capital grants received by the United States (net) (4–2) | 0 |
| | | | 12 | Statistical discrepancy (1–26) | <u>– 5.5</u> |
| | Gross investment | 545.9 | | Gross saving and statistical discrepancy | 545.9 |

Note: Numbers in parentheses indicate accounts and items of counterentry in the accounts. For example, the counterentry for wage and salary disbursements (2–7) is in account 2, line 7.

Table 1.B.1 Selected Source Data for Current-Dollar Estimates, 1983–85

| Source Data | Personal Consumption Expenditures | | Wages and Salaries | Other Labor Income | Proprietors' Income ^a | |
|---|-----------------------------------|-----------------------------|----------------------|--------------------|----------------------------------|-------------------|
| | Goods | Services | | | Farm | Nonfarm |
| Census Bureau annual surveys of merchant wholesale and retail trade | 1983–84 ^r | ... | ... | ... | ... | ... |
| Census Bureau annual survey of services | ... | 1983–84 ^r , 1985 | ... | ... | ... | 1985 |
| Internal Revenue Service tabulations of business tax returns: | | | | | | |
| Corporations | ... | 1983 | ... | 1983 | ... | ... |
| Sole proprietorships and partnerships | ... | 1984 | ... | 1984 | ... | 1984 |
| Census Bureau value of new construction put in place | ... | ... | ... | ... | ... | 1985 ^r |
| Census Bureau annual survey of manufacturers | ... | ... | ... | ... | ... | ... |
| U.S. Department of Agriculture farm statistics | 1983–85 ^r | 1983–85 ^r | 1983–85 ^r | ... | 1983–85 ^r | ... |

| | | | | | | |
|--|----------------------|-----------------------------|-----------------------------|-----|----------------------|----------------------|
| Bureau of Economic Analysis U.S. international transactions accounts | 1983–85 ^r | 1983–85 ^r | 1983–85 ^r | ... | ... | ... |
| Office of Management and Budget federal budget data | ... | ... | 1985 | ... | ... | ... |
| Census Bureau surveys of state and local government | ... | ... | ... | ... | ... | ... |
| Bureau of Labor Statistics tabulations of employees covered by state unemployment insurance | ... | 1983–84 ^r , 1985 | 1983–84 ^r , 1985 | ... | ... | ... |
| Bureau of Economic Analysis capital stock statistics | ... | ... | ... | ... | 1983–85 ^r | 1983–85 ^r |

Note: Years shown are the years of the estimates into which the source data are directly incorporated; ^r = revised.

^aWith inventory valuation adjustments and capital consumption adjustments.

^bWith capital consumption adjustments.

(continued)

Table 1.B.1 (continued)

| | Personal Interest Income | Corporate Profits ^a | Capital Consumption Allowances ^b | Government Expenditures | | Government Receipts | |
|---|--------------------------------|-----------------------------------|---|--------------------------|-----------------------------|--------------------------|-----------------------------|
| | | | | Federal | State and Local | Federal | State and Local |
| Census Bureau annual surveys of merchant wholesale and retail trade | ... | ... | ... | ... | ... | ... | ... |
| Census Bureau annual survey of services | ... | ... | ... | ... | ... | ... | ... |
| Internal Revenue Service tabulations of business tax returns: | | | | | | | |
| Corporations | 1983 | 1983 | 1983 | ... | ... | 1983 | ... |
| Sole proprietorships and partnerships | 1984 | ... | 1984 | ... | ... | ... | ... |
| Census Bureau value of new construction put in place | ... | ... | ... | ... | 1985 ^r | ... | ... |
| Census Bureau annual survey of manufacturers | ... | ... | ... | ... | ... | ... | ... |
| U.S. Department of Agriculture farm statistics | 1983–85 ^r | ... | ... | ... | ... | ... | ... |
| Bureau of Economic Analysis U.S. international transactions accounts | 1983–85 ^r | 1983–85 ^r | ... | ... | ... | 1983–85 ^r | ... |
| Office of Management and Budget federal budget data | 1984 ^r , 1985 | ... | ... | 1984 ^r , 1985 | ... | 1984 ^r , 1985 | ... |
| Census Bureau surveys of state and local government | 1983–84 | ... | ... | ... | 1983 ^r , 1984–85 | ... | 1983 ^r , 1984–85 |
| Bureau of Labor Statistics tabulation of employees covered by state unemployment insurance | ... | ... | ... | ... | 1984 ^r , 1985 | ... | ... |
| Bureau of Economic Analysis capital stock statistics | ... | 1983–85 ^r | 1983–85 ^r | ... | ... | ... | ... |

to derive selected components of personal income and outlays; it also shows data sources used to derive other selected NIPA measures discussed later.⁷³ The table indicates the years for which source data available in July 1986 were used. As the table shows, many of these source data are subject to revision and involve reporting lags. Consequently, BEA estimates based on these data must also be revised periodically to incorporate revisions in the source data.

For PCE, the annual data sources in table 1.B.1 are used to extrapolate benchmark estimates. The PCE benchmark estimates are based on the final demand category of BEA's most current benchmark input-output tables. The input-output tables, in turn, are based primarily on the detailed industry statistics available in the economic censuses.⁷⁴ The BEA 1977 input-output table is the most current and was incorporated into NIPA estimates during the 1985 comprehensive revision.

For personal tax and nontax payments, the annual federal estimates are derived mainly from Treasury data on collections of withheld federal income taxes and Federal Insurance Contribution Act (FICA) payments.⁷⁵ Estimates of FICA payments are netted. The FICA estimates are derived using Social Security Administration estimates of wages subject to FICA coverage and applying appropriate tax rates. The annual state and local estimates are based on quarterly Census Bureau data on tax collections.⁷⁶

For wages and salaries, the annual estimates are based mainly on quarterly BLS compilations of wages and salaries reported by employers covered under state unemployment insurance tax programs.⁷⁷ Federal employee wage and salaries estimates are not available from this source. They are derived mainly from Office of Personnel Management payroll data.

For other labor income, the data sources vary with the items included. The main items are employer contributions to private pensions, to health insurance, and to life insurance. Annual estimates of contributions to private pensions are based mainly on IRS tabulations of the tax returns of sole proprietorships, partnerships, and corporations.⁷⁸ Annual estimates of contributions to health insurance funds are derived mainly from data on premiums provided by Blue Cross/Blue Shield, the Health Insurance Association of America, and the Department of Health and Human Services. Annual estimates of contributions to life insurance funds are derived mainly from data on premiums provided by the American Council of Life Insurance and by the Department of Health and Human Services.

For proprietors' income with IVA and CCAdj, annual estimates are based primarily on IRS tabulations of the tax returns of sole proprietorships and partnerships. Because it is recognized that there is significant underreporting of income on these tax returns, adjustments for

underreporting are made in estimating nonfarm proprietors' income. These adjustments are developed by BEA primarily on the basis of IRS audit results.

For personal interest income, annual estimates are derived indirectly using a number of interest flows.⁷⁹ The estimates are based primarily on IRS tabulations from tax returns of interest paid and received by sole proprietorships, partnerships, and corporations. Additional sources include Treasury data on federal interest paid, federal budget data on federal interest received, census data on state and local government interest paid and received, and IRS and Labor Department data on interest received by private noninsured pension funds.⁸⁰ Interest paid by consumers to business is derived primarily by multiplying Federal Reserve data on outstanding consumer credit by BEA estimates of effective interest rates.⁸¹

For transfer payments, annual estimates of government transfer payments are based primarily on federal budget data, Treasury data, and data from agencies administering the programs, such as the Social Security Administration for part of social security benefits. Annual estimates of business transfer payments are based primarily on insurance industry data and IRS tax return data.

For personal contributions for social insurance, annual estimates for most of the federal component are derived in the same way as employer contributions discussed in connection with personal tax and nontax payments. These estimates depend mainly on Social Security Administration data on taxable wages. The state and local government component estimates are derived mainly from census data on retirement programs and BLS data on disability programs.⁸²

Undistributed corporate profits with IVA and CCAdj is the sum of (1) profits before tax less profits tax liability less dividends, (2) the corporate IVA, and (3) the corporate CCAdj. These entries are part of charges against GNP shown in Appendix A, NIPA summary account 1.⁸³ For the profits, taxes, and dividends entries, annual estimates are based primarily on IRS tabulations of the tax returns of corporations. Annual estimates also depend partly on Federal Reserve data on the net earnings of Federal Reserve banks, census data on state and local corporate profits tax liability, and BEA balance of payments accounts data on rest-of-the-world profits.⁸⁴ Like the proprietors' income estimates, the tax return data are adjusted by BEA for underreporting on the basis of IRS audit results.

The corporate IVA estimates are based primarily on census data on manufacturing and trade inventories and BLS producer price index data on commodity prices.⁸⁵ The corporate CCAdj estimates are derived primarily using IRS tabulations of tax return depreciation and

economic depreciation derived from BEA perpetual inventory method calculations of the capital stock.⁸⁶

Capital consumption appears as part of charges against GNP.⁸⁷ The annual estimates are based primarily on the same sources as those discussed in connection with the corporate CCAdj.

The components of receipts and expenditures underlying the government surplus or deficit are shown in Appendix A, NIPA summary account 3. On the expenditures side, the two largest entries are purchases of goods and services and transfer payments. On the receipts side, the three largest entries are personal tax and nontax payments, indirect business taxes, and contributions for social insurance. Only purchases and indirect business taxes have not yet been discussed.

Annual estimates of federal purchases of goods and services, like those for federal transfer payments, are based primarily on federal budget data, Treasury data, and data from agencies concerning their operations.⁸⁸ The annual estimates of state and local government purchases are based primarily on census compilations of state and local budget data.

Annual estimates of federal indirect business taxes are based on collections data tabulated by IRS. Annual estimates of state and local government indirect business taxes are based largely on census data.

Net foreign investment appears as part of payments to foreigners in Appendix A, NIPA summary account 4.⁸⁹ Annual estimates of net foreign investment are based mainly on census data on merchandise trade and BEA surveys of direct foreign investment income and other services. BEA balance of payments accounts data and Treasury data on international capital flows are also used.

Notes

1. A recent example of a policy discussion involving NIPA saving measures is in Council of Economic Advisers (1986, 46–52).

2. Definitions of some of the components in NIPA table 5.1 and some additional notes about them are provided below (Bureau of Economic Analysis 1986a). The components of gross private saving are defined as follows. Personal saving is “personal income less the sum of personal outlays and of personal tax and nontax payments. It is current saving of individuals (including proprietors), nonprofit institutions serving individuals, private noninsured welfare funds, and private trust funds” (xii).

Undistributed corporate profits with IVA and CCAdj consists of three separate elements: undistributed corporate profits, IVA, and CCAdj. Undistributed corporate profits is corporate profits before tax—sometimes referred to as

“book profits”—less corporate profits tax liability less dividends. IVA for corporations is “the difference between the cost of inventory withdrawals as valued in determining profits before tax and the cost of withdrawals valued at current replacement cost” (x). CCAdj for corporations is corporate tax-return-based CCA less estimates of CCA that more accurately reflect economic depreciation (CCA with CCAdj).

CCA with CCAdj is capital consumption “based on the use of uniform service lives, straight line depreciation, and replacement costs” (xi). For the part of CCA with CCAdj related to nonprofit institutions serving individuals, it is “the value of the current services of the fixed capital assets owned and used by these institutions” (xi). In NIPA table 5.1, corporate CCA with CCAdj is shown separately from the corresponding noncorporate measure.

Wage accruals less disbursements is retroactive wages that are measured on a when paid basis rather than a when earned basis.

The components of the government surplus or deficit are defined as follows. The federal surplus or deficit is the sum of federal government receipts less federal government expenditures, both on a NIPA basis. The state and local government surplus or deficit involves the same calculation with state and local government receipts and expenditures.

With respect to foreign transactions, capital grants is a component of gross saving in NIPA table 5.1; net foreign investment is a component of gross investment. Capital grants received by the United States (net) is mainly the allocation of Special Drawing Rights to the United States. Net foreign investment is “U.S. exports of goods and services and capital grants received by the United States (net), less imports of goods and services by the United States, transfer payments to foreigners (net), and U.S. Government interest paid to foreigners” (xii). A recent discussion of foreign transactions in the NIPAs is in Tice and Moczar (1986).

3. Numerous studies use, or start with and adjust, the NIPA personal saving-to-disposable personal income ratio or the net private saving-to-net national product ratio. Examples include von Furstenberg (1981), Auerbach (1982), Hendershott and Peek (1985), Boskin (1986), Bosworth (1986), and Peek (1986).

4. The slope coefficients from linear trends using the measures in figure 1.1 are as follows (*t*-statistics in parentheses): gross saving, -0.01 (-0.6); gross private saving, 0.06 (6.6); government saving, -0.08 (-3.5); and net private saving, -0.02 (-1.6). The standard errors of the regression, which are percentage points and are used here as an indicator of amplitude, are as follows: gross saving, 1.41; gross private saving, 0.60; government saving, 1.37; and net private saving, 0.90.

5. An attempt to provide theoretical and empirical support for Denison’s law is in David and Scadding (1974). Criticisms can be found in Boskin (1986) and Kotlikoff (1984).

6. Wage accruals less disbursements must also be added to personal saving and undistributed corporate profits to equal net private saving exactly. Movements in the personal saving-to-GNP ratio closely parallel those in the more often discussed personal saving-to-disposable personal income ratio.

7. It must be noted that capital consumption and undistributed corporate profits are not independent components of saving because corporate profits are derived, in part, by deducting depreciation charges from receipts. Therefore, there is a dollar-for-dollar inverse relation between the corporate component of capital consumption and undistributed corporate profits, *ceteris*

paribus. There is a similar relation between capital consumption and personal saving through rental income and proprietors' income.

8. After adjustment to remove cyclical responses, the federal measure still shows a strong trend toward deficit. For a discussion of the issues and estimates of the cyclical effects, see de Leeuw and Holloway (1983) and Holloway (1986).

9. However, the receipt of savings from the rest of the world was not large enough to compensate for the decline in gross saving.

10. These trends are drawn from the 1950–85 period. Over longer periods, there are obvious qualifications. For example, the federal deficit-to-GNP ratio during the 1980s was well below the ratio during World War II.

11. Additional statements, elaborations, and reaffirmations of the purposes of the NIPAs are in Jaszi (1958, 1971, 1986), Jaszi and Carson (1979), and Carson and Jaszi (1981, 1986).

12. While current production and the income generated by that production have welfare implications, the focus of the NIPAs is not on the measurement of economic welfare per se. The many issues related to the measurement of welfare in a NIPA context have been discussed for decades. See, e.g., Jaszi (1958), Easterlin (1958), Eisner (1971, 1985), Gordon (1971), Okun (1971), Adler (1982), Moss (1973), and Juster (1977).

13. Some of the issues related to capital gains are discussed in National Accounts Review Committee (1957), Jaszi (1958), Goode (1976), Ruggles and Ruggles (1982a, 1982b), Hibbert (1983), Hill (1984), and Eisner (1985).

14. National income is a measure of production valued at factor cost.

15. A major problem with the inclusion of nonmarket activities is that valuation is extremely difficult. However, many ingenious attempts have been made to assign values to various types of activities. See, e.g., Kendrick (1979), Katz and Peskin (1980), Martin, Landefeld, and Peskin (1982), and Katz (1983).

16. The exact definition of illegal activity in the NIPAs is reflected by the preceding sentences in the main text but is more complicated than would appear at first glance. Some transactions are illegal for one party but not for the other. For example, it is illegal for illegal aliens to work in the United States, but, prior to 1987, it was not illegal for employers to hire them. In this case, the production of these workers was and is included in the NIPAs. Carson (1984a, 1984b) explores some of the issues further.

The NIPA practice of excluding illegal activities is not the international standard. For example, the System of National Accounts of the United Nations calls for inclusion, although, in practice, the accounts of many countries also exclude them.

17. Carson (1984b) provides a hypothetical example of the NIPA treatment of imported drugs. The growing need to measure illegal activities has been suggested by some economists. See, e.g., Adler (1982).

18. Obviously, there are many other conceptual issues related to the scope and measurement of current production besides those mentioned in the text. Some of the issues include the intermediate vs. final product debates related to government transactions, financial transactions, advertising, and transportation to work; and the more extensive use of imputations to extend the production boundary. For discussion of some of these issues, see Jaszi (1958), Hawrylyshyn (1974), Kendrick (1979), Adler (1982), Ruggles and Ruggles (1982a, 1982b), Berger (1983), and Eisner (1985).

19. The five-account summary was proposed by Jaszi (1958) to replace a six-account summary that showed a separate business account. Jaszi's proposal

was endorsed by the National Accounts Review Committee (1957) and has been used by BEA since 1958. The central focus on GNP was emphasized in Jaszi (1971). For discussions of the evolution of the accounts, see Carson (1975) and Ruggles (1983).

20. Production accounts show production attributable to a sector. Appropriation accounts show sector income, outlays, and saving. Saving-investment accounts show the sector's gross saving, net increase in assets, and net increase in liabilities. Young and Tice (1985) provide a detailed discussion of the relation of the national economic accounting system to conventional accounting statements used by business and government.

21. Using data for 1953, Denison (1955) explains how the ex post saving-investment equality comes about.

22. A more complete listing in addition to those mentioned includes mutual financial institutions, private noninsured pension funds, cooperatives, nonprofit organizations that serve business, federally sponsored credit agencies, and the treatment as business entities of buildings and equipment owned and used by nonprofit organizations serving individuals.

23. Denison (1955, 1982a) has suggested that the most meaningful distinction among categories of NIPA saving is between total government saving and total private saving. However, even this distinction is very sensitive to certain conventions. The NIPA treatment of public pensions, discussed later, is an example.

24. Part of the conceptual justification is that nonprofit institutions, like households, are often final consumers of goods and services.

25. Obviously, many other classification decisions are also important. For example, not classifying realized capital gains as income has important ramifications for NIPA measures. For further discussion related to capital gains, see National Accounts Review Committee (1957) and Eisner (1985).

26. The timing of investment also has implications for NIPA saving measures. For example, construction is recorded in the NIPAs on a "value put in place" basis—i.e., the value of work done during the period. Except for electric utilities, estimates of capital consumption begin when construction begins.

27. Detailed tables of NIPA imputations are published annually in the July *Survey of Current Business*. In the July 1986 *Survey*, NIPA table 8.9 shows the major NIPA imputations, and NIPA table 8.8 shows additional details concerning interest imputations.

28. For a discussion of some of the difficulties, see Jaszi (1971).

29. A discussion of the estimation of the stocks based on the perpetual inventory method is in Musgrave (1979), Young and Musgrave (1980), Bureau of Economic Analysis (1982), and Gorman et al. (1985). Recent time series are in Musgrave (1986a, 1986b).

30. For a discussion of some of the issues, see National Accounts Review Committee (1957).

31. A discussion of the estimation of these stocks is in Young and Musgrave (1980) and Musgrave (1980). Recent time series are in Musgrave (1986a, 1986b).

32. For further discussion concerning the treatment of research and development expenditures, see Juster (1973), Hawrylyshyn (1974), Blades and Sturm (1982), and Blades (1983). Some of the problems mentioned with respect to measuring intangible investment are even more pronounced when human capital is considered. Investments in human capital occur through education, health maintenance, on-the-job training, and the like. Classifying these expenditures as capital expenditures has been suggested but is not done in the NIPAs. Some

of the issues are discussed in Eisner (1971), Kendrick (1971, 1979), Juster (1973), and Jaszi (1971, 1973).

33. Public pensions is defined broadly here to include social security, federal civilian retirement, state and local government retirement, railroad retirement, and military retirement. The treatment of military retirement changed recently. The Defense Authorization Act for fiscal year 1984 established a military retirement trust fund similar to the civil service retirement trust fund. In the 1985 comprehensive revision, a NIPA social insurance fund was created to reflect this law change, and an employer contribution was imputed back to 1929. An equal amount was imputed to expenditures so government saving was not affected. For details, see Bureau of Economic Analysis (1985a).

34. It is assumed in the NIPAs that all the ownership interest in private noninsured pension plans is held by the ultimate beneficiaries. Consequently, all the investment earnings are attributed to persons. In the case of plans operated by life insurance carriers, both ultimate beneficiaries and shareholders may have a claim on the investment earnings if the insurance carrier is a stock corporation. Consequently, most of the investment earnings are attributed to persons, but some may be attributed to shareholders.

35. Imputed interest paid to persons from private pension funds is part of an item published in NIPA table 8.8 in the July 1986 *Survey of Current Business*. The item is imputed interest paid by life insurance carriers and private noninsured pension plans, and it amounted to about \$102 billion in 1985—\$48 billion by life insurance carriers and \$55 billion by private noninsured pension plans. This imputed interest item includes investment earnings in the form of rent, interest, and dividends, but it excludes capital gains. The amounts are not imputed; the imputation arises in attributing these earnings to persons and in treating all the earnings as interest. Only part of imputed interest paid by life insurance carriers is from pension funds. The remainder includes interest on life insurance policies.

36. The operating expenses are not shown separately in BEA publications. However, expenditures for the expenses of handling life insurance, which includes these operating expenses along with other items, are published in NIPA table 2.4 in the July 1986 *Survey of Current Business*. The 1985 estimate was about \$34 billion. The nontaxable income components in personal income are discussed in Park (1986).

37. In the July 1986 *Survey of Current Business*, recent estimates appear in NIPA table 6.13 on other labor income by industry and by type.

38. Personal income excludes transfer payments to foreigners.

39. Even though there would not be an effect on the total government surplus or deficit, there would be offsetting effects on the social insurance funds surplus or deficit and the all "other" surplus or deficit. The BEA regularly publishes these separate measures.

40. Realized capital gains are excluded as they are elsewhere in the NIPAs.

41. For general discussions of NIPA revisions and assessments of the estimates, see Jaszi (1963), Cole (1969), Young (1974), Office of Federal Statistical Policy and Standards (1977), and Parker (1984b). Annual NIPA estimates go through a series of revisions. Each July, estimates for the most recent calendar year and the two preceding calendar years are usually revised. Using calendar year 1981 as an example, the first revision (referred to as the first July) would occur in July 1982, the second revision (referred to as the second July) would occur in July 1983, and the third revision (referred to as

the third July) would occur in July 1984. After the third July revision, the estimates would not be revised again until a comprehensive revision occurs. Comprehensive revisions—sometimes referred to as benchmarks—occur about every five years. The latest was completed in 1985.

42. The reclassification of mobile homes involved about 90 percent of these purchases; the other 10 percent had previously been classified as investment in producers' durable equipment.

43. Interest in introducing economic depreciation is expressed in National Accounts Review Committee (1957), Jaszi (1958), Denison (1971), and Jaszi (1971). The statistical implementation is discussed in Young (1975).

44. The 1976 comprehensive revision followed one in 1965. Consequently, it reflected changes over a 10-year period rather than over the typical 5-year period.

45. The new treatment allocated reinvested earnings, which is the difference between net earnings and dividends paid, to investors in proportion to their equity interest. Because reinvested earnings of incorporated foreign affiliates of U.S. direct investors exceeded the reinvested earnings of incorporated U.S. affiliates of foreign direct investors, the revision resulted in an upward revision of net exports, net foreign investment, and undistributed corporate profits.

46. Major replacements include such things as heating systems and roofing.

47. The shipments were mainly to Israel.

48. Discussions of statistical revisions incorporated during the 1985 comprehensive revision are in Donahoe (1984), Bureau of Economic Analysis (1985a), and Parker and Fox (1985).

49. BEA studies concerning the underground economy include Carson (1984a, 1984b), Parker (1984a), and de Leeuw (1985).

50. Specifically, the Census Bureau uses the information to define the universe of large firms and for basic data on small firms. For details, see Parker (1984a).

51. The effects of the improved adjustments for selected years are shown in table 4 in Parker and Fox (1985). Annual estimates of the effects for wages and salaries and nonfarm proprietors' income are shown in table 1 in Park (1986).

52. The revisions are measured as differences between estimates available when the July 1986 *Survey of Current Business* was published and those available when the November 1985 *Survey* was published. The definitional and classificational revisions are from the 1985 comprehensive revision. Consequently, the effects of the July revision appear under statistical revisions.

53. The pre-comprehensive revision data are those published in the November 1985 *Survey of Current Business*; the current data are those published in the July 1986 *Survey*.

54. The revisions in the bases of the ratios are from all sources.

55. July revisions are usually skipped in the year of a comprehensive revision. Further details about the revision schedule are in n. 41 above.

56. No July revision was conducted in 1981.

57. Similar results for many NIPA series using earlier estimates and previous comprehensive revisions are shown in Office of Federal Statistical Policy and Standards (1977).

58. See, e.g., Barro (1978).

59. Some early discussions of the need for balance sheets are in Goldsmith (1955, 1958). Later calls for balance sheets are in Gainsbrugh (1971), Jorgenson (1971), Kendrick (1971), Ruggles and Ruggles (1971, 1982b), and Goldsmith (1971, 1985).

60. For example, the discrepancies between NIPA and flow-of-funds saving measures undermine the statistical relation between NIPA saving measures and Federal Reserve balance sheet estimates. For a discussion of the discrepancies, see Gorman (1983) and de Leeuw (1984).

61. Further discussion of the issues in connection with the System of National Accounts is in United Nations (1977). It should be noted that a focus on welfare measurement could lower measured output instead of raise it if deductions for pollution abatement and the like were large enough.

62. Goldsmith has suggested that both disposable income and personal saving are often understated in the NIPAs. Reference to this position is in von Furstenberg (1981).

63. For example, Bosworth (1986) adjusts a measure of net private saving to include the pension fund activities of state and local governments. The flow-of-funds accounts attribute state and local government pension fund activities to their household sector.

64. The data for EC and PC are published in NIPA table 3.6 and for TP in NIPA table 3.11 in the *Survey of Current Business*. The data for the other terms are unpublished.

65. The adjustments are restricted to federal civilian retirement programs.

66. The view that consumer durable goods should be reflected in NIPA saving measures has been advocated by many economists for many years and is probably the most frequent criticism of the measures. A sampling of the critics include Ando (1971), Eldridge (1971), Kendrick (1971, 1979), Ruggles and Ruggles (1971, 1982a, 1982b), and Hendershott and Peek (1985). Denison (1982a, 1982b) has argued for the present treatment.

67. Using the definitions of the variables shown below equations (4)–(6) in the text, the net return on government capital (N_g) can be defined as

$$N_g = V_g - M_g - D_g.$$

The service value can be written as

$$V_g = N_g + M_g + D_g.$$

Because M_g is currently in actual expenditures in eq. (4), it must be subtracted from V_g to avoid double counting. The change in receipts in eq. (5) is the addition of the net return.

68. Using the definitions of the variables shown below eqq. (7)–(9) in the text, and letting T_c = personal property taxes on consumer durable goods, the net return on consumer durable goods (N_c) can be defined as

$$N_c = V_c - M_c - D_c - i_c - T_c.$$

The service value can be written as

$$V_c = N_c + M_c + D_c + i_c + T_c.$$

To arrive at DPI* in eq. (7), the net return (N_c) is added to personal income, and personal property taxes are subtracted from personal tax and nontax payments. DPI is not affected by changes in the treatment of interest paid on credit-financed consumer durable goods because net interest increases by exactly the amount that interest paid by consumers to business decreases. These latter two interest items are summed with other interest items to derive personal interest income.

To arrive at O^* in eq. (8), several changes are required. Outlays (O) include both PCE and interest paid by consumers to business. PCE is changed by adding the service value (V_c); subtracting expenditures on consumer durable goods (I_c), which are reclassified as investment; and subtracting maintenance and repairs (M_c), which must be done to avoid double counting. M_c is part of both O and V_c (for a similar double counting issue, see n. 67 above). Interest paid by consumers to business is changed by subtracting interest paid on credit-financed consumer durable goods, which is reclassified as net interest.

69. I derived estimates for 1980–85 judgmentally on the basis of movements in selected interest rates and the net stocks of consumer durables and government capital.

Martin, Landefeld, and Peskin (1982) estimate the service value of government capital as the sum of depreciation and net return. They exclude maintenance and repairs because of lack of data. Given this definition of service value, GNP changes by the sum of depreciation and net return. Their net return is based on a constant 7 percent rate of return and the net stock of government capital.

Katz and Peskin (1980) and Katz (1982) estimate the service value of consumer durables as the sum of depreciation, maintenance and repairs, personal property taxes, and net return (defined to include interest paid). Their net return is based on a complex weighted average of rates of return applied to the net stock of consumer durables by type.

In contrast to the approach discussed above for consumer durables, considerably less involved approaches could be used. For example, in the flow-of-funds accounts, consumer durables are treated as investment, but no net return or service value is estimated. Depreciation on consumer durable goods is deducted from gross household saving to estimate net household saving.

70. The cyclical adjustment of the federal budget has a long history. Early cyclically adjusted budgets were based on estimates of potential GNP consistent with full employment or high employment without accelerating inflation. More recent estimates rely on a noncyclical trend for GNP that is more closely linked to the trend in actual GNP. For a discussion of some of the concepts and measurement procedures, see de Leeuw et al. (1980) and de Leeuw and Holloway (1982, 1983).

71. The cyclically adjusted measures are based on middle-expansion trend GNP; this middle-expansion series is used in the denominator of the cyclically adjusted ratio. For details, see de Leeuw and Holloway (1983) and Holloway (1986).

72. For details about many of the sources and methods underlying personal income, taxes, and outlays, see Byrnes et al. (1979). See also Bureau of Economic Analysis (1981).

73. Parts of table I.B.1 are reproduced from Bureau of Economic Analysis (1986b). In virtually all cases, source data are adjusted for timing, coverage, or other differences to conform to NIPA concepts and conventions.

74. The 1977 input-output tables depend mainly on the 1977 economic censuses. The 1977 tables also use the 1980 census of housing, the 1977 census of governments, and the 1978 census of agriculture.

75. The Treasury data are published in *Monthly Treasury Statement*. Among other adjustments, the BEA adjusts these data for timing differences between employer withholding and Treasury collection.

76. The census data are published in *Quarterly Summary of Federal, State, and Local Tax Revenue*.

77. The BLS data are published in *Employment and Wages*.

78. The IRS data are published in *Statistics of Income: Sole Proprietorship Returns*, *Statistics of Income: Partnership Returns*, and *Statistics of Income: Corporation Income Tax Returns*.

79. Personal interest income is interest income of persons from all sources. It is derived as the sum of (1) interest paid by business less interest received by business, (2) interest received from abroad less interest paid abroad, (3) interest paid by government to persons and business less interest received by government, and (4) interest paid by consumers to business. A detailed discussion is in Bureau of Economic Analysis (1981).

80. The Treasury data are published in *Monthly Treasury Statement*. The federal budget data are published in *Budget of the United States*. The state and local government data are published in *Governmental Finances*.

81. The Federal Reserve data are published in *Federal Reserve Bulletin*.

82. The census data are published in *Finances of Employee Retirement Systems of State and Local Governments*.

83. Complete documentation on sources and methods for corporate profits is in Bureau of Economic Analysis (1985c).

84. The Federal Reserve data are published in their *Annual Report*. The census data are published in *Quarterly Summary of Federal, State, and Local Tax Revenue*.

85. For a discussion of some of the data and methods related to manufacturing inventories, see Hinrichs and Eckman (1981).

86. The perpetual inventory method calculations are described in Young and Musgrave (1980) and Gorman et al. (1985). The method essentially involves estimating gross stocks by cumulating estimates of gross investment, then subtracting estimates of assets that have completed their service lives. Depreciation estimates are derived by applying depreciation rates (based on the straight-line depreciation formula) to the gross stocks.

87. A discussion of some of the sources and methods underlying capital consumption is in Young (1975) and Gorman et al. (1985).

88. In practice, many of the estimates that comprise federal purchases are derived as residuals. For example, total budget outlays for a program are known from budget documents. Amounts from the program attributed to transfer payments, grants in aid to state and local governments, or other types of expenditures excluding purchases are estimated. These amounts are deducted from the total to estimate purchases.

89. Complete documentation on sources and methods for foreign transactions, including net foreign investment, is in Tice and Moczar (1986). Additional documentation will be published in a forthcoming BEA methodology paper.

References

- Adler, Hans J. 1982. Selected problems of welfare and production in the national accounts. *Review of Income and Wealth* 28 (June): 121–32.
- Ando, Albert. 1971. An econometrician comments on the national income and product accounts. *Survey of Current Business* 51 (July): 1–3.
- Auerbach, Alan J. 1982. Issues in the measurement and encouragement of business saving. In *Saving and government policy*, 79–100. Federal Reserve

- Bank of Boston Conference Series, no. 25. Boston: Federal Reserve Bank of Boston.
- Barro, Robert J. 1978. *The impact of social security on private saving: Evidence from the U.S. time series*. Washington, D.C.: American Enterprise Institute for Public Policy Research.
- Berger, S. 1983. Dividing government product between intermediate and final uses: A comment. *Review of Income and Wealth* 29 (September): 333–34.
- Blades, Derek. 1983. Alternative measures of saving. *Organisation for Economic Co-operation and Development Occasional Studies* (June): 66–84.
- Blades, Derek, and Peter H. Sturm. 1982. The concept and measurement of savings: The United States and other industrialized countries. In *Saving and government policy*, 1–30. Federal Reserve Bank of Boston Conference Series, no. 25. Boston: Federal Reserve Bank of Boston.
- Board of Governors of the Federal Reserve System. 1987. *Balance sheets for the U.S. economy, 1947–86*. Washington, D.C.: Board of Governors of the Federal Reserve System.
- Boskin, Michael J. 1982. Federal government deficits: Some myths and realities. *American Economic Review* 72 (May): 296–303.
- . 1986. Theoretical and empirical issues in the measurement, evaluation, and interpretation of postwar U.S. saving. In *Savings and capital formation*, ed. F. Gerard Adams and Susan M. Wachter, 11–43. Lexington, Mass.: D. C. Heath & Co.
- Bosworth, Barry P. 1986. Savings and government policy. In *Savings and Capital Formation*, ed. F. Gerard Adams and Susan M. Wachter, 173–87. Lexington, Mass.: D. C. Heath & Co.
- Bureau of Economic Analysis. 1981. Special note—Personal interest income. *Survey of Current Business* 61 (September): 4–5.
- . 1982. *Fixed reproducible tangible wealth in the United States, 1925–79*. Washington, D.C.: U.S. Government Printing Office.
- . 1985a. An advance overview of the comprehensive revision of the national income and product accounts. *Survey of Current Business* 65 (October): 19–28.
- . 1985b. An introduction to national economic accounting. Bureau of Economic Analysis Methodology Paper, series MP-1. Washington, D.C.: U.S. Government Printing Office.
- . 1985c. Corporate profits: Profits before tax, profits tax liability, and dividends. Bureau of Economic Analysis Methodology Paper, series MP-2. Washington, D.C.: U.S. Government Printing Office.
- . 1986a. *The national income and product accounts of the United States, 1929–82: Statistical tables*. Washington, D.C.: U.S. Government Printing Office.
- . 1986b. The U.S. national income and product accounts: Revised estimates. *Survey of Current Business* 66 (July): 7–23.
- Byrnes, James C., Gerald F. Donahoe, Mary W. Hook, and Robert P. Parker. 1979. Monthly estimates of personal income, taxes, and outlays. *Survey of Current Business* 59 (November): 18–36.
- Carson, Carol S. 1975. The history of the United States national income and product accounts: Development of an analytical tool. *Review of Income and Wealth* 21 (June): 153–81.
- . 1984a. The underground economy: An introduction. *Survey of Current Business* 64 (May): 21–37.
- . 1984b. The underground economy: An introduction. *Survey of Current Business* 64 (July): 106–17.

- Carson, Carol S., and George Jaszi. 1981. The national income and product accounts of the United States: An overview. *Survey of Current Business* 61 (February): 22–34.
- . 1986. The use of national income and product accounts for public policy: Our successes and failures. Bureau of Economic Analysis Staff Paper, no. 43. Washington, D.C.: U.S. Government Printing Office.
- Cole, Rosanne. 1969. *Errors in provisional estimates of gross national product*. New York: Columbia University Press.
- Council of Economic Advisers. 1986. *Economic report of the president*. Washington, D.C.: U.S. Government Printing Office.
- David, Paul A., and John Scadding. 1974. Private savings: Ultra-rationality, aggregation and “Denison’s law.” *Journal of Political Economy* 82 (March/April): 225–49.
- de Leeuw, Frank. 1984. Conflicting measures of private saving. *Survey of Current Business* 64 (November): 17–33.
- . 1985. An indirect technique for measuring the underground economy. *Survey of Current Business* 65 (April): 64–72.
- de Leeuw, Frank, and Thomas M. Holloway. 1982. The high-employment budget: Revised estimates and automatic inflation effects. *Survey of Current Business* 62 (April): 21–33.
- . 1983. Cyclical adjustment of the federal budget and federal debt. *Survey of Current Business* 63 (December): 25–40.
- de Leeuw, Frank, Thomas M. Holloway, Darwin G. Johnson, David S. McClain, and Charles A. Waite. 1980. The high-employment budget: New estimates, 1955–80. *Survey of Current Business* 60 (November): 13–43.
- Denison, Edward F. 1955. Saving in the national economy: From the national income perspective. *Survey of Current Business* 35 (January): 8–24.
- . 1958. A note on private saving. *Review of Economics and Statistics* 40 (August): 261–67.
- . 1971. U.S. national income and product estimates: Evaluation and some specific suggestions for improvement. *Survey of Current Business* 51 (July): 36–44.
- . 1982a. Comment on Blades and Sturm’s “The concept and measurement of savings: The United States and other industrialized countries.” In *Saving and government policy*, 39–45. Federal Reserve Bank of Boston Conference Series, no. 25. Boston: Federal Reserve Bank of Boston.
- . 1982b. Comment on Ruggleses’ “Integrated economic accounts for the United States, 1947–80.” *Survey of Current Business* 62 (May): 59–65.
- Denison, Edward F., and Robert P. Parker. 1980. The national income and product accounts of the United States: An introduction to the revised estimates for 1929–80. *Survey of Current Business* 60 (December): 1–26.
- Donahoe, Gerald F. 1984. The national income and product accounts: Preliminary estimates, 1977. *Survey of Current Business* 64 (May): 38–41.
- Easterlin, Richard A. 1958. Comment on Jaszi’s “The conceptual basis of the accounts: A re-examination.” In *A critique of the United States income and product accounts*, 127–40. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 22. Princeton, N.J.: Princeton University Press.
- Eisner, Robert. 1971. New twists to income and product. *Survey of Current Business* 51 (July): 67–68.
- . 1985. The total incomes system of accounts. *Survey of Current Business* 65 (January): 24–48.

- . 1986. *How real is the federal deficit?* New York: Free Press.
- Eisner, Robert, and Paul J. Pieper. 1984. A new view of the federal debt and budget deficits. *American Economic Review* 74 (March): 11–29.
- Eldridge, Douglas H. 1971. Congratulations from the National Bureau. *Survey of Current Business* 51 (July): 69–71.
- Gainsbrugh, Martin R. 1971. Measuring the nation's wealth. *Survey of Current Business* 51 (July): 72–73.
- Goldsmith, Raymond W. 1955. *A study of saving in the United States*. New York: Greenwood Press.
- . 1958. Saving. In *A critique of the United States income and product accounts*, 448–54. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 22. Princeton, N.J.: Princeton University Press.
- . 1971. Toward a national balance sheet. *Survey of Current Business* 51 (July): 74–79.
- . 1985. *Comparative national balance sheets: A study of twenty countries, 1688–1978*. Chicago: University of Chicago Press.
- Goode, Richard. 1976. *The individual income tax*. Washington, D.C.: Brookings Institution.
- Gordon, R. A. 1971. Looking forward after fifty years. *Survey of Current Business* 51 (July): 80–82.
- Gorman, John A. 1983. Data needs in flow of funds. In *The U.S. national income and product accounts: Selected topics*, ed. Murray Foss, 409–15. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 47. Chicago: University of Chicago Press.
- Gorman, John A., John C. Musgrave, Gerald Silverstein, and Kathy A. Comins. 1985. Fixed private capital in the United States. *Survey of Current Business* 65 (July): 36–59.
- Hawrylyshyn, Oli. 1974. *A review of recent proposals for modifying and extending the measure of GNP*. Ottawa: Statistics Canada.
- Hendershott, Patric H., and Joe Peek. 1985. Household saving: An econometric investigation. In *The level and composition of household saving*, ed. Patric H. Hendershott, 63–100. Cambridge, Mass.: Ballinger Publishing Co.
- Hibbert, Jack. 1983. *Measuring the effects of inflation on income, saving and wealth*. Paris: Organisation for Economic Co-operation and Development.
- Hill, Peter. 1984. Inflation, holding gains, and saving. *OECD Economic Studies* 2 (Spring): 151–64.
- Hinrichs, John C., and Anthony D. Eckman. 1981. Constant-dollar manufacturing inventories. *Survey of Current Business* 61 (November): 16–23.
- Holloway, Thomas M. 1986. Cyclical adjustment of the federal budget and federal debt: Revised and updated estimates. *Survey of Current Business* 66 (March): 11–17.
- Jaszi, George. 1958. The conceptual basis of the accounts: A re-examination. In *A critique of the United States income and product accounts*, 13–126. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 22. Princeton, N.J.: Princeton University Press.
- . 1963. The quarterly national income and product accounts of the United States, 1942–62. Paper presented at the annual meeting of the International Association for Research in Income and Wealth, Corfu, June.
- . 1971. An economic accountant's ledger. *Survey of Current Business* 51 (July): 183–227.
- . 1973. Comment on Juster's "A framework for the measurement of economic and social performance." In *The measurement of economic and*

- social performance*, ed. Milton Moss, 84–99. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 38. New York: Columbia University Press.
- . 1986. An economic accountant's audit. *American Economic Review* 76 (May): 411–17.
- Jaszi, George, and Carol S. Carson. 1976. The national income and product accounts of the United States: Revised estimates, 1929–74. *Survey of Current Business* 56 (January): 1–38.
- . 1979. The national income and product accounts of the United States: An overview. *Survey of Current Business* 59 (October): 25–34.
- Jorgenson, Dale W. 1971. Econometric research and the national accounts. *Survey of Current Business* 51 (July): 99–102.
- Juster, F. Thomas. 1973. A framework for the measurement of economic and social performance. In *The measurement of economic and social performance*, ed. Milton Moss, 25–84. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 38. New York: NBER.
- . 1977. *Distribution of economic well-being*. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 41. Cambridge, Mass.: Ballinger Publishing Co. for the NBER.
- Katz, Arnold J. 1982. The value of services provided by the stock of consumer durables, 1947–79: Alternative user cost measures. In *Measuring nonmarket economic activity: BEA working papers*. Bureau of Economic Analysis Working Paper, no. 2. Washington, D.C.: U.S. Government Printing Office.
- . 1983. Valuing the services of consumer durables. *Review of Income and Wealth* 29 (December): 405–28.
- Katz, Arnold J., and Janice Peskin. 1980. The value of services provided by the stock of consumer durables, 1947–77: An opportunity cost measure. *Survey of Current Business* 60 (July): 22–31.
- Kendrick, John W. 1971. The national accounts: The heart of OBE's statistical program. *Survey of Current Business* 51 (July): 103–4.
- . 1979. Expanding imputed values in the national income and product accounts. *Review of Income and Wealth* 25 (December): 349–63.
- Kotlikoff, Laurence J. 1984. Taxation and savings: A neoclassical perspective. *Journal of Economic Literature* 22 (December): 1576–1629.
- Levin, David J. 1984. The state and local government fiscal position: An alternative measure. *Survey of Current Business* 64 (March): 23–25.
- . 1986. Alternative measure of the state and local government fiscal position: Revised and updated estimates. *Survey of Current Business* 66 (April): 36.
- Martin, Frank, J. Steven Landefeld, and Janice Peskin. 1982. The value of services provided by the stock of government-owned fixed capital, 1948–79. In *Measuring nonmarket economic activity: BEA working papers*. Bureau of Economic Analysis Working Paper, no. 2. Washington, D.C.: U.S. Government Printing Office.
- Moss, Milton, ed. 1973. *The measurement of economic and social performance*. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 38. New York: NBER.
- Musgrave, John C. 1979. Durable goods owned by consumers in the United States, 1925–77. *Survey of Current Business* 59 (March): 17–25.
- . 1980. Government owned fixed capital in the United States, 1925–79. *Survey of Current Business* 60 (March): 33–43.
- . 1986a. Fixed reproducible tangible wealth in the United States: Revised estimates. *Survey of Current Business* 66 (January): 51–75.

- . 1986b. Fixed Reproducible tangible wealth in the United States, 1982–85. *Survey of Current Business* 66 (August): 36–39.
- National Accounts Review Committee. 1957. The national economic accounts of the United States: Review, appraisal, and recommendations. Hearings before the Subcommittee on Economic Statistics of the Joint Economic Committee, Congress of the United States. 85th Cong., 1st sess.
- Office of Federal Statistical Policy and Standards. 1977. *Gross national product data improvement project report*. Report of the Advisory Committee on Gross National Product Data Improvement. Washington, D.C.: U.S. Government Printing Office.
- Okun, Arthur M. 1971. Social welfare has no price tag. *Survey of Current Business* 51 (July): 129–33.
- Park, Thae S. 1986. Relationship between personal income and adjusted gross income: Revised estimates, 1947–83. *Survey of Current Business* 66 (May): 34–40.
- Parker, Robert P. 1984a. Improved adjustments for misreporting of tax return information used to estimate the national income and product accounts, 1977. *Survey of Current Business* 64 (June): 17–25.
- . 1984b. Revisions to the initial estimates of quarterly gross national product of the United States, 1968–83. Paper presented at the Seminar on Provisional and Revised Estimates of Economic Data, Florence, Italy, November.
- Parker, Robert P., and Douglas R. Fox. 1985. Revised estimates of the national income and product accounts of the United States, 1929–85: An introduction. *Survey of Current Business* 65 (December): 1–19.
- Peek, Joe. 1986. Household wealth composition: The impact of capital gains. *New England Economic Review* (November/December): 26–39.
- Ruggles, Richard. 1983. The United States national income accounts, 1947–1977: Their conceptual basis and evolution. In *The U.S. national income and product accounts: Selected topics*, ed. Murray Foss, 15–96. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 47. Chicago: University of Chicago Press.
- Ruggles, Richard, and Nancy D. Ruggles. 1971. The evolution of national accounts and the national data base. *Survey of Current Business* 51 (July): 152–61.
- . 1982a. Integrated economic accounts: Reply. *Survey of Current Business* 62 (November): 36–53.
- . 1982b. Integrated economic accounts for the United States, 1947–80. *Survey of Current Business* 62 (May): 1–53.
- . 1985. The integration of macro and micro data for the household sector. Paper presented at the annual meeting of the American Economic Association, New York, December.
- Tice, Helen Stone, and Louis J. Moczar. 1986. Foreign transactions in the national income and product accounts: An overview. *Survey of Current Business* 66 (November): 23–36.
- United Nations. Department of Economic and Social Affairs. 1977. *The feasibility of welfare-oriented measures to supplement the national accounts and balances: A technical report*. New York: United Nations.
- von Furstenberg, George M. 1981. Saving. In *How taxes affect economic behavior*, ed. Henry J. Aaron and Joseph A. Pechman, 327–90. Washington, D.C.: Brookings Institution.
- Young, Allan H. 1974. Reliability of the quarterly national income and product accounts of the United States, 1947–71. Bureau of Economic Analysis Staff Paper, no. 23. Washington, D.C.: U.S. Government Printing Office.

- _____. 1975. New estimates of capital consumption allowances revision of GNP in the benchmark. *Survey of Current Business* 55 (October): 14–16, 35.
- Young, Allan H., and John C. Musgrave. 1980. Estimation of capital stock in the United States. In *The measurement of capital*, ed. Dan Usher, 23–58. NBER Conference on Research in Income and Wealth. Studies in Income and Wealth, vol. 45. Chicago: University of Chicago Press.
- Young, Allan H., and Helen Stone Tice. 1985. An introduction to national economic accounting. *Survey of Current Business* 65 (March): 59–74.

Comment Paul Wachtel

There are not very many people who can write a paper like this, although there are a great number of people who can profit from it. Only a Bureau of Economic Analysis (BEA) insider like Thomas Holloway can have the store of institutional knowledge and the access to information necessary to prepare a reference work on the national income and product account (NIPA) data. Also, it is refreshing to see a BEA staff member make the judgments and statements of opinion that are often lacking in the formal BEA presentations in the *Survey of Current Business*. Thus, this paper is both enjoyable and useful.

This paper is an insider's account but not an insider's exposé. Holloway does not condemn the procedures used by the BEA or call for any sweeping changes in the definitions employed in the accounts. Nevertheless, a careful reading of the paper provides some good indication of the kinds of changes and improvements that might be made by the BEA in the not too distant future.

Since the paper presents a formidable body of information, it may appear at first glance to be impenetrable. This is not the case because Holloway has prepared a text that is clear and full of informative asides on the workings of the NIPAs. Nevertheless, it will be useful to summarize some of the ideas as I present my own views.

Holloway begins with the definitions of saving that are used in the various official presentations and that appear in most of the ubiquitous discussions of the so-called American saving problem. The concepts employed in the NIPAs are gross saving, gross private saving, and net private saving. In addition, much attention is paid to saving rates—particularly the one published by the BEA, the personal saving rate. Holloway's inspection of the data leads to a few conclusions. (1) Using any of the three economy-wide saving definitions, saving rates really do seem to validate Denison's law or the hypothesis that saving rates

are secularly stable.(2) If there is any recent decline in saving rates, it is seen only in the ratio of net private saving to gross national product (GNP), which has had a negative trend since the mid-1960s. This saving rate averaged 8.4 percent in 1965–69 and 6.2 percent in 1980–85. It is also true that the gross saving rate was low in the 1980s because of the large federal government deficits (negative government saving). Private saving was not unusually low in these years. (3) The striking difference in the recent data as compared to earlier years is the large increase in volatility observed recently. (4) The stability of the saving rate is not due to the stability of its parts. For example, personal saving and business saving often move in opposite directions. The negative trend of net private saving noted above occurred because the declines in personal saving were only partly offset by increases in business saving. In the same period, the gross saving rate was steady because capital consumption increased.

I will pause here to interject my own views. The tendency of many economists—students of growth and NIPA accountants—to emphasize overall or aggregate saving measures always puzzles me. Our amazement with Denison's law leads us to overlook the final point that Holloway makes—the heterogeneity of movements among saving components. The components of saving are so disparate and so inter-related that I think we make a big mistake by often focusing on the aggregates.

In my view, we need to have a matrix of saving figures that picks up data from the various NIPA sectors. For example, a matrix for net saving would include rows for each of the NIPA sectors and columns for at least three saving components. That is, there could be rows for the personal, business, government, and foreign sectors and columns for expenditures on physical assets, capital consumption allowances and adjustments, and the sectoral financial surplus.

This framework is similar to a flow-of-funds approach, but only conceptually. Like the flow-of-funds approach, it represents a matrix of activities and sectors. However, I am not advocating that the entries in the matrix be funds flows. I think the conceptual approach is helpful, but I am not suggesting that the NIPAs be made into a financial accounting system. As Holloway reminded me, it is apparent that the flow-of-funds staff at the Federal Reserve has a tougher time developing estimates than does the NIPA staff. Thus, it would be premature to suggest that an attempt be made to integrate the two accounting systems. Instead, my suggestion is that the matrix approach used in the flow-of-funds be adapted to the NIPA system as it now exists.

The NIPA data can be readily used to prepare the saving matrix outlined above. Definitions and data for 1986 are shown in table C1.1, which uses only readily available published data. The references in the

Table C1.1 U.S. Net Saving Matrix, 1986 (billions of dollars)

| Sector | Investment Expenditures | — | Depreciation | + | Sectoral Surplus | = | Net Saving |
|-----------------|-------------------------------------|---|--------------------|---|----------------------|---|--------------------|
| Personal | 218.3 ^a | | 100.8 ^b | | 13.1 | | 130.6 ^c |
| Business | 452.8 | | 355.9 | | – 4.4 | | 92.5 ^d |
| Government | 0 | | 0 | | – 147.8 ^e | | – 147.8 |
| Foreign | 0 | | 0 | | 143.9 ^f | | 143.9 |
| Discrepancy | 0 | | 0 | | – 4.9 ^g | | – 4.9 |
| Total | 671.0 ^h | | 456.7 ⁱ | | 0 | | 214.3 |
| Reconciliation: | | | | | | | |
| | + Depreciation | | | | | | 456.7 |
| | = Gross private domestic investment | | | | | | 671.0 |
| | + Net foreign investment | | | | | | – 143.9 |
| | = Gross investment ^j | | | | | | 527.1 |
| | – Statistical discrepancy | | | | | | 4.9 |
| | = Gross saving ^k | | | | | | 532.0 |

Note: Data are taken from the July 1987 *Survey of Current Business*, and the notes provide labels when they correspond to NIPA usage. Entries without any references are simply derived from the row or column totals and the other entries. The familiar saving aggregates appear as row or column totals in the matrix. The references in parentheses in the notes that follow are to table and line numbers from the standard tables in the *Survey*.

^aResidential, (5.2.16).

^b(5.2.17).

^cPersonal saving, (5.1.3)

^d(5.1.2.) – (5.1.3) – (5.2.2).

^eGovernment surplus, (5.1.11).

^fMinus net foreign investment, –(5.1.17).

^gStatistical discrepancy, (5.1.18).

^hGross private domestic investment, (5.2.1).

ⁱ(5.2.2).

^j(5.1.15).

^k(5.1.1).

table notes are to table and line numbers from the standard presentation in the *Survey of Current Business*; the data are from the July 1987 *Survey*. The notes also provide labels for the matrix entries when they correspond to standard NIPA usage. Entries without any references are simply derived from the row or column totals and the other entries. The familiar saving aggregates appear as row or column totals in the matrix.

Existing data could easily be used to refine the presentation shown here. For example, some part of housing expenditure and depreciation should be moved to the business sector. Furthermore, alternative definitions of saving could be incorporated into the matrix. For example, consumer durables could be treated as a capital good using data already

prepared by the BEA, and a capital account for the government sector could be added as well. An advantage of the matrix framework is that it could be used to expand the definition of saving and also facilitate the continued presentation of existing concepts.

This matrix presentation is valuable because it shifts our focus from the aggregates and Denison's law to Holloway's point about the heterogeneity of movements among saving components. This is hardly a radical innovation; it simply reorganizes the data in the NIPAs to emphasize components and concepts that are already there and to avoid the presentation that presents the pieces as a buildup to a grand finale called gross saving and investment.

The column of table C1.1 labeled "sectoral surplus" introduces a concept that is new to the NIPAs. It is important because it provides some information about the deficit and surplus sectors in the economy. Contemporary policy discussions are often concerned with whether foreign saving is too large, whether personal saving available to the other sectors is too small, and so on. These sectoral surpluses have varied considerably over time. Table C1.2 summarizes the surpluses as percentages of GNP in the past twenty-five years. I think that these numbers are ultimately more revealing than the standard measures of aggregate saving.

The above discussion raises the question of what is the purpose of the saving aggregate. This is the issue that Holloway logically turns to next. For some purposes, the NIPA gross saving concept is useful; for others, we might want a broader concept that capitalizes all sorts of expenditures and includes unfunded liabilities; and for yet other purposes, we might want an even narrower definition. Holloway starts with an exploration of the conceptual intent of the current accounting scheme.

Some of the issues and arguments set out are well known. The NIPAs are by intent based on current production (capital gains do not enter) and limited to legal market activities. Some of the other issues are less well understood. A most informative part of the paper is Holloway's investigation of the sectoring scheme used in the NIPAs. The NIPAs

Table C1.2 **Sectoral Surplus as Percent of GNP**

| | Personal | Business | Government | Foreign |
|---------|----------|----------|------------|---------|
| 1960-64 | 1.4 | -.1 | -.2 | -.8 |
| 1965-69 | 2.5 | -1.7 | -.3 | -.4 |
| 1970-74 | 3.2 | -2.3 | -.6 | -.3 |
| 1975-79 | 2.5 | -1.0 | -1.4 | -.2 |
| 1980-86 | 2.3 | -.9 | -2.7 | 1.3 |

Note: Data are rounded and are averages of annual ratios for years shown.

can be very confusing when one encounters entities classified in one production sector whose saving is attributed to another sector.

For example, unincorporated businesses are in the business sector, but their saving is attributed to the personal sector. Another example involves pension funds. Personal saving includes the saving of households and associations of individuals (which include nonprofit institutions). Thus, the saving of pension funds and life insurance saving are attributed to the personal sector (and they are large parts of the total), although these are business-sector entities.

Pension fund reserves are viewed as owned by individuals, and their investment earnings (\$100 billion in 1985) are imputed interest earnings to persons. An estimate of their operating expenses (which does not include benefits paid) is a consumption expenditure. Employer contributions to pension funds are current labor income; thus, benefits paid are not. To compound the confusion, state and local government pension funds are treated entirely differently.

Another set of classification decisions that affect saving measures is the decision to treat certain expenditures as investment. In particular, the arguments for and against the capitalization of business research and development expenditures, consumer durables expenditures, and government capital expenditures are summarized.

Holloway seems to be leaning toward the inclusion of a government capital account (he notes that much of the data are already available, although developing imputed income estimates for government capital presents difficulties), perhaps for the capitalization of consumer durables (data are available, if not entirely reliable), for consistent treatment of public and private pensions (he virtually predicts this change in a future benchmark revision), but against capitalizing intangibles like research and development and unfunded pension liabilities. Thus, he (and, I think, correctly) is not suggesting that the NIPAs be turned into a social accounting framework, but he is willing to make improvements that retain the current production/market activity orientation of the accounts. NIPA saving should not be an attempt to measure changes in all claims on wealth.

The last major topic addressed in the paper is measurement and revision. The issue here is whether the standard data are robust to changes in measurement concepts and/or data revisions. More specifically, does a supposed decline in saving disappear as better data become available or as small conceptual changes are introduced? This is an important topic for the NIPAs in general.

Data revisions of two kinds are made to NIPAs, and Holloway examines both of them. First, there are changes in definition and classification that are made at the time of "comprehensive" revision—about once every five years. Second, there are "annual" revisions—

usually made in July—that introduce improved data measurement for the three prior calendar years. Each year's data are subject to three such revisions as more complete information becomes available.

In either case, it is important to note that saving measures are particularly susceptible to changes introduced by the revision process. Saving is the difference between income and expenditure. Small revisions to income and expenditure can result in large changes in the difference.

Some examples of the changes in classification and definition introduced in recent comprehensive revisions follow: (1) Expenditures on mobile homes was moved from personal consumption expenditure (because it is a car) to investment (because it is a house), which reflected changes in the use of the product (1976). (2) Reinvested earnings of foreign affiliates were added to receipts and payments of income (1980). As a result, net foreign investment, undistributed corporate profits, and gross saving increased. In the 1970s, this increased the ratio of gross saving to GNP by half a percentage point. (3) An "underground economy" adjustment was made to better account for underreporting (1985). Personal consumption expenditures, wages, and proprietors' nonfarm income increased (in 1984 by \$44, \$24, and \$78 billion, respectively). Since income went up by more than consumption, saving increased.

The total revisions (regardless of source) are of interest. Here, the aggregate may be more interesting than the very different parts. The difference between definitional/classificational or statistical revisions is less interesting than the difference between the original data used for analysis and decision making and the revised data, which is presumably the "truth." Thus, the magnitude of the revisions tells us something about the adequacy of the data already used. Does the revision process alter our view of the world? For example, Holloway's figure 1.3 suggests that, prior to comprehensive revisions in 1986, the net private saving-to-net national product ratio trended down from 1965 on. After the revisions, no such trend is apparent.

The final part of the paper examines the effects on our familiar saving measures of feasible data improvements. Holloway presents them in an unjudgmental fashion. I can be a little bolder and will not hesitate to tell you what I think of each one. Holloway mentions five issues: (1) broaden the accounting framework (e.g., include capital gains); (2) broaden the concept of production (e.g., include an imputation for household work); (3) make the treatment of private and public pensions consistent; (4) capitalize more expenditures; and (5) measure government saving differently.

I would not like to see the NIPAs move away from a current market production emphasis, but for many purposes a broader view is valuable. Pat Hendershott and Joe Peek (chap. 5, in this vol.) show that saving

behavior is very much related to aspects of saving that are not measured in the income accounts. It is silly to study the NIPA definition of personal saving in isolation without exploring capital gains on housing and equities, inflation effects on liabilities, and the role of unfunded pension wealth. However, this does not imply that the NIPA saving definition should be broadened to account for all these issues. Instead, it would be helpful to develop a national balance sheet that is integrated with the NIPAs and therefore can be used to supplement the standard accounts.

I think this would be a good idea that would enable us to expand, at will, saving definitions to include, for example, capital gains. There are of course several balance sheet accounts available (the work of Robert Eisner, Richard and Nancy Ruggles, and Raymond Goldsmith are well-known examples), but each is inconsistent with the NIPA sectoring in some way. The desirability of an integrated balance sheet is most clear for the household sector, for which our personal saving measure is a poor indicator of the change in wealth because capital gains tend to offset personal saving.

The conceptual boundaries in the NIPAs could be broadened in a number of ways.

1. Include imputations for housework that would increase income and outlays by the same amount and leave saving unchanged. But the saving rate would decline. This change always strikes me as unnecessary for the vast majority of issues for which the accounts are used.

2. Capitalize consumer durables. This is simple to do, and I have always been puzzled why the BEA is so hesitant to take the step. Let me suggest that they provide the necessary data as some addendum items on the tables and leave formal definitions as they are. Adding this to personal saving increases the level but changes the trends only slightly. The increase in the saving rate in the 1960s would be larger because net investment in durables was particularly high at that time.

3. Estimate illegal activity.

4. Make the treatment of private and public pension funds consistent. This is logical, could easily be done, and, as already noted, may well be on the way. Public employee pension funds operate like private pension funds and should not be lumped with social insurance contributions. (The flow-of-funds accounts do put the saving of state and local government pension funds in the household sector.) This change would leave gross saving the same, but it would increase personal saving and reduce government saving. Holloway's figure 1.4 shows the effect of this change in attribution. Saving patterns are pretty much the same, but the decline in personal saving since 1975 is less pronounced.

5. Capitalize government expenditures. This should be no more difficult, arbitrary, or controversial than similar decisions for the private

sector. The government sector of the NIPAs is not the government budget, so capitalization in the accounting scheme has nothing to do with budget policy. The main effect of such a change would be to increase government saving. The small deficits of the 1960s would be surpluses, and the large deficits of the 1980s would be somewhat smaller, although still very large.

6. An interesting but controversial issue is the unfunded liabilities of social insurance funds and, for that matter, of lots of other entities. Imputations for these liabilities could be incorporated into an expanded balance sheet and also counted as saving. However, I, too, would step lightly here because the potential for controversy is great. There would be too much disagreement about how to define these imputations.

7. The last example treated by Holloway struck me as a little odd. Although the BEA does make cyclical adjustments to the government budget deficit in order to generate a standardized measure of fiscal influence, this is not related to the NIPAs at all. The numbers are well prepared (largely by Holloway) and widely used and respected, but these activities of the BEA should stand apart from the NIPAs.

Despite the length of these comments, Holloway and I generally agree with one another. Neither of us advocates change in the current production/market activity focus of the accounts. We do look favorably on some minor changes that affect saving and the addition of some data items that would enable users to alter their saving definitions at will.

The only point of difference is the one that I started with. Holloway seems to favor retaining a single saving measure. I am almost willing to abolish the term. I am interested not in the “saving” of the household sector but in its capital accumulation, its wealth augmentation (including capital gains), and its surplus or the resources it makes available to other sectors of the economy. The concept of saving should not be one dimensional—both our discussions of saving problems and our presentations of the data should be cognizant of this.